The Chemical Age

A Weekly Journal Devoted to Industrial and Engineering Chemistry

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NOTICES:—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.

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High Pressure Gas Research

ON Monday of this week, visitors who were privileged to see something of the operations of the High Pressure Gas Research Laboratory of the Department of Chemical Technology of the Imperial College, could not fail to be impressed by the remarkable work which is there in progress. Professor W. A. Bone has built up at South Kensington an organisation which is in every way remarkable.

The work done is proceeding along a number of lines. Explosions in gases, hydrogenation, catalytic processes in gases, and various other things are under investigation, and results of a most valuable kind are being accumulated. The investigations are of a fundamental scientific kind, and it is a testimony to their important nature that Imperial Chemical Industries and the Gas Light and Coke Co. have made a contribution towards the cost of the apparatus. The era of industrial applications of high pressure chemistry is now well under way, and it is a matter for congratulation that there is in being at South Kensington an organisation fitted to make great additions to our knowledge of the fundamentals of this great new field.

Apart from its value on the purely investigational side, Professor Bone's organisation has another aspect of great importance, namely, the training of workers. One of the difficulties of developing industrially any discoveries involving a new and highly specialised technique (such as that of high pressure work) is that operators skilled in the technique in question are few and far between. The High Pressure Gas Research Laboratory at South Kensington will go far towards relieving the difficulty. In this laboratory workers receive such a complete and varied training that their value to industry must be very great. It is clear that in this department of chemistry Great Britain is showing a fine example to the rest of the world.

I.G. Foreign Developments

IT appears from rather meagre Press reports from Germany and elsewhere that very important developments are pending in regard to the foreign policy of the I.G. The German trust is said to be establishing (according to some accounts has already established) an American holding company to deal with its foreign interests, with the co-operation of American financiers. The vagueness of the news as so far received is accentuated by the fact that the new holding company is apparently connected in some way with an undertaking established in Switzerland last year by the I.G. The undertaking in question, known as the Internationale Gesellschaft für Chemische Unternehmungen, with headquarters at Basle and a capital of 20,000,000 Swiss francs, has hitherto been a mystery. Even well-informed German sources of information have not been able to throw any light on its nature and objects. It is now suggested that the share of the I.G. in the new American company will be vested in the Internationale Gesellschaft für Chemische Unternehmungen (one German journal suggesting that the latter company was apparently only a transition stage in the formation of the American company), and that the shareholders of the I.G. are eventually to be given the opportunity of acquiring an interest in the Swiss company on the basis of their shareholdings.

The object of the American holding company, apparently, is to assist in the expansion of the foreign sales of the I.G., especially synthetic nitrogen compounds. This would give America a financial interest in German synthetic fertilisers, and hence would further complicate the present competition between synthetic fertilisers and Chilean nitrate, which already has the support of American capital. Out of all these suggestions and surmises, coming from various quarters, it is difficult to arrive at any conclusion, especially as detailed information regarding the nature of the American holding company and its capital and constitution is conspicuous by its absence. The whole affair is rendered even more puzzling by the consoli-

dation and unification now proceeding in the American chemical industry itself, as exemplified in the recent absorption of the Grasselli company by E. I. du Pont de Nemours.

It will be strange indeed if the above-mentioned reports regarding the participation of the American holding company in the expansion of the sales of I.G. fertilisers be confirmed, for the annual report of the Secretary of Agriculture of the United States, recently issued, makes the following statement:—"American farmers are, of course, still heavily dependent on foreign materials for nitrates and potash. Exploitation by foreign agencies not subject to American control can only be terminated by the development of American production, at least to the point where the prices of these essential commodities will be dictated at home and not abroad." This same report indicates that the production of fixed nitrogen in the United States is of the order of 36,000 tons a year, which will be doubled by plants now under construction. "In comparison with Germany's output of fixed nitrogen," continues the statement, "ours is small. Germany's annual production of 660,000 tons indicates the need for energetic development of the American industry." All of which seems to run counter to what has been reported about the activities of the I.G.'s American holding company.

Broadcasting and Scientific Terminology

THE British Broadcasting Corporation committee which deals with pronunciation has recently had occasion to deal with various scientific words. Some considerations arising out of this, with which chemists and other scientific workers will be in whole-hearted agreement, are touched on by Dr. P. E. Spielmann in a letter which appeared in *The Times* recently. "The amiable and fully justified protest by Mr. Ronald Hepburn on the pronunciation of 'margarine,' laid down for their announcers' guidance by the B.B.C." (writes Dr. Spielmann), "opens the question as to how far a committee of very eminent writers, actors, and phoneticians is a competent authority for dealing with purely scientific words. In 'margarine' the *g* is hard because the name was originally associated with margaric acid (where the *g* is obviously hard). . . . . A considerably worse example of the committee's activities has been the recommendation that 'iodine' should be pronounced as though rhyming with 'thine' No chemist ever pronounces the name of this substance and those of its related fluorine, chlorine, and bromine in any other way than by rhyming them with "sheen," and the chemist should be the sole authority on his own words."

One of the most important results of the activities of the B.B.C. has been a greatly increased interest in scientific matters on the part of the general public, and it is very desirable that the latter should grow more accustomed to scientific terminology. The concluding sentence of Dr. Spielmann's letter puts the case very clearly, and it is to be hoped that the B.B.C. will take scientific advice in regard to scientific words. Otherwise, the general public will acquire some of its science in a strange language; a language, moreover, towards the adoption of which scientific men who broadcast for the B.B.C. may show (to say the least of it) a very strong disinclination. So far, the ingenuity of the B.B.C. has been exercised only on simple words. When the Corporation begins to soar to the higher flights of Beilstein, it will probably be able (though not intentionally) to combine a good deal of amusement with its instruction.

Solvent Production

ELSEWHERE in this issue appears a note on the developments which are occurring at Hull with regard to the manufacture of solvents. British Industrial Solvents, Ltd., with which a number of important interests are connected, is to proceed with the manufacture of three very important products, acetic acid, acetone, and butyl alcohol, as well as various others. Future events will be awaited with great interest. It is clear from the information already available that plans have been made with great care, and after a wide and careful survey of all that has been done elsewhere. This is one more example of the steady and orderly manner in which British chemical industry, in all its branches, is being consolidated and extended.

Books Received

THE THEORY AND TECHNIQUE OF QUANTITATIVE ANALYSIS. By Marie Farnsworth. London: Chapman and Hall, Ltd. New York: John Wiley and Sons, Inc 154. 12s. 6d.

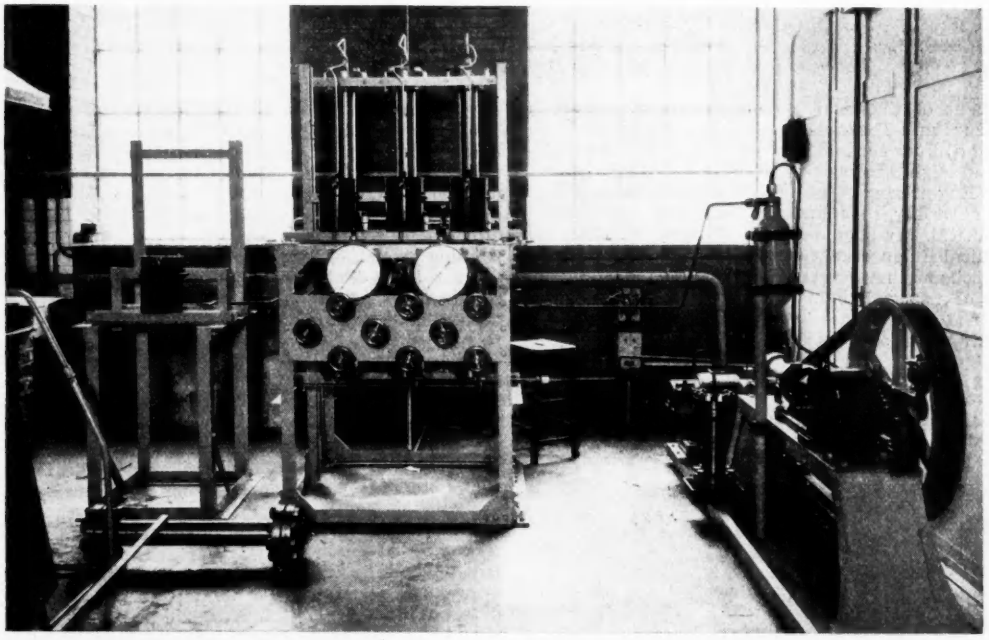
VOLUMETRIC ANALYSIS. By A. J. Berry. Cambridge: University Press. Pp. 152. 6s.

DIATOMITE. By N. L. Eardley-Wilmot. Department of Mines, Canada. Ottawa: F. A. Acland. Pp. 182. 30 cents.

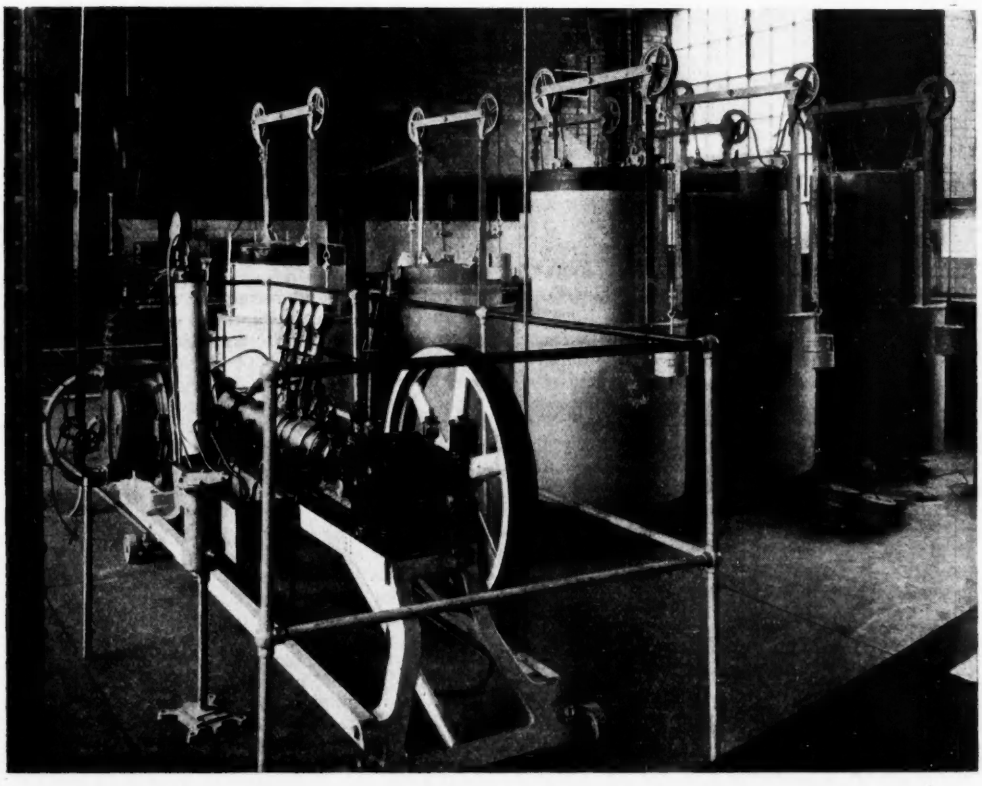
The Calendar

Jan. 28	Royal Society of Arts. Cantor Lecture (II.)—"The Treatment of Coal." Dr. C. H. Lander. 8 p.m.	John Street, Adelphi, London.
28	Sir John Cass Technical Institute: Public Introductory Lecture to a course of 12 Lectures on "Coal Carbonisation." F. S. Sinnatt. 7 p.m.	Jewry Street, Aldgate London
28	University of Birmingham Chemical Society: "Sulphur and Rubber." Dr. D. F. Twiss.	University, Birmingham.
29	Institute of Chemistry (Bristol and S.W. Counties Section): "Some Toxicological Cases." Edward Russell. 7.30 p.m.	University, Bristol.
30	Society of Chemical Industry (Newcastle Section): "Tar Distillation." Lecture II. S. A. Wikner.	Armstrong College Newcastle-on-Tyne
31	University College, London: Lecture III.—"The Chemistry of Some Natural Drugs." Dr. H. R. Ing. 5 p.m.	Gower Street, London.
Feb. 1	Institute of Chemistry (South Wales Section): "Further Notes on Pure Chemicals. E. A. Tyler. 7.30 p.m.	Thomas Café, High Street Swansea
1	Society of Chemical Industry (Manchester and Liverpool Sections): "The Sulphur Compounds of Shale Oil and Petroleum." F. Challenger.	Manchester
1	West Cumberland Society of Chemists and Engineers: "Producer Gas Manufacture." A. T. Grisenthwaite. 7 p.m.	Workington
4	Royal Society of Arts: Cantor Lecture. "The Treatment of Coal." III. Dr. C. H. Lander.	John Street, Adelphi, London
4	Society of Chemical Industry (London Section): "Petroleum as a Source of Synthetic Material." Dr. A. E. Dunstan.	Burlington House, Piccadilly, London

High Pressure Gas Research Apparatus at the Imperial College



MULTIPLE-UNIT HIGH PRESSURE CATALYTIC CIRCULATING SYSTEM, FOR PRESSURES UP TO 1,000 ATMOSPHERES AND TEMPERATURES UP TO 600° C.



THE GAS PREPARATION LABORATORY, SHOWING STORAGE HOLDERS AND 1,000 ATMOSPHERES 5-STAGE COMPRESSOR.
OTHER PHOTOGRAPHS APPEAR ON PAGE 67.

Chemical Technology at the Imperial College

High Pressure Gas Research and Other Work

On Monday, the Department of Chemical Technology of the Imperial College of Science and Technology, South Kensington, London, was thrown open to inspection, particular attention being drawn to the new equipment of the High Pressure Gas Research Laboratories. An account of the Department and its activities appears below.

THE Department of Chemical Technology of the Imperial College of Science and Technology, now comprising the three sub-Sections of (i) Fuel Technology with Refractory Materials, Combustion and High Pressure Gas Reactions and Explosions; (ii) Chemical Engineering; and (iii) Electrochemistry, was inaugurated in October, 1912, under the direction of Professor W. A. Bone, F.R.S. It should be noted, however, that the needs of Chemical Engineering, which were included from the outset in the scheme, have recently been further met by the establishment of a special chair with separate budget in that subject. At the same time an Assistant-Professorship in Electrochemistry was established.

Buildings and Staff

The first two storeys of the present departmental building (providing for Fuel Technology and in part for Chemical Engineering) were erected in 1913; after the war two more

PROFESSOR W. A. BONE, F.R.S., HEAD OF THE DEPARTMENT OF CHEMICAL TECHNOLOGY AT IMPERIAL COLLEGE.

storeys (for Chemical Engineering and Electrochemistry were added to it; but the continuous growth of the department, and more particularly its research developments, have rendered the present accommodation quite inadequate for the increasing needs of its work and activities.

A scheme for the further enlargement of the building, which will provide accommodation for new research developments, has been approved, and will be carried out as soon as the required money is forthcoming. The capital expenditure on buildings and equipment to date has been approximately £60,000; and about £50,000 more is required for the extensions now contemplated.

The teaching staff at present numbers seven, namely the organising head of the Department, Professor W. A. Bone, F.R.S., who is also in special charge of its Fuel Technology Section; Professor J. W. Hinchley, Professor of Chemical Engineering; Assistant-Professor G. I. Finch (in charge of Electrochemistry); Messrs. G. W. Himus, W. C. Hancock and S. G. M. Ure, lecturers; and Mr. W. E. Stockings, instructional assistant. In addition, mention may be made of Drs. D. M. Newitt and D. T. A. Townend, senior research assistants in the High Pressure Gas Research Laboratories. There is a staff of four skilled mechanics, with the resources of a fine modern workshop, to look after the equipment and make apparatus needed for research work.

Work of the Department

The work of the Department is exclusively of a postgraduate and research character, no student being admitted who has not already graduated (in chemistry as principal subject, with mathematics, mechanics and physics as subsidiary subjects) either at the Imperial College or elsewhere; and it is chiefly directed to giving such postgraduates a broad and practical training on fundamental lines, including research experience, of a sort calculated not only to widen their knowledge, but also to develop their personalities and special interests, so as to fit them for responsible positions in industry, either in regard to plant control and management, or as research chemists, or even on the commercial and economic (including selling) side of the chemical and fuel industries.

At present there are working in the Department:—15 first year full-time postgraduate students, 10 second year full-time postgraduate research students, and 18 paid full-time research assistants and fellows, besides sundry occasional students. So that, counting in the teaching staff who are also all engaged in directing and prosecuting research work, there are 50 people continually carrying on scientific and technological studies in the Department at a total running cost (including salaries, wages, apparatus and material) of approximately £13,000 per annum, of which about £7,000 is defrayed out of the ordinary college funds, the remainder coming in the form of aids and grants from various extra-mural sources.

Since its inauguration, upwards of 150 postgraduate students have already passed through the Department, most of whom are occupying responsible posts as fuel technologists, plant managers, chemical engineers, or research chemists in industrial concerns. They have been drawn from many parts of the Empire and the world, including (*inter alia*) Australia, Canada, India, South Africa, the United States, China, Japan, etc.

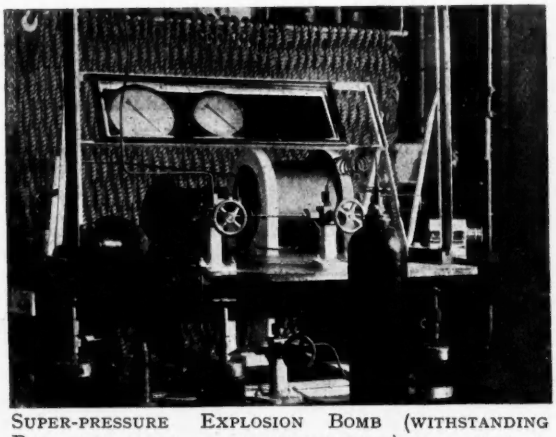
Nature of Training Given

Throughout the courses stress is laid on a student acquiring a knowledge of the economic and historical, as well as of the chemical and mechanical, aspects of industrial processes and developments, and on his becoming skilled in chemical manipulation and laboratory arts. Also, the importance of a chemist being somewhat of a geologist is insisted upon. In the Fuel Laboratories, he is taught to carry out the chemical analysis of fuels and refractory materials, gas analysis, fuel pyrometry and calorimetry, tar distillation, etc., with accuracy and despatch; and in the research laboratories, efficiency in operations such as glass-blowing, and the purification, liquefaction and rigid drying of gases is insisted upon. In the chemical engineering laboratories, students are trained in the use of hand tools. Indeed, in all sections of the Department, the importance of good handicraft and of accurate analytical work is stressed.

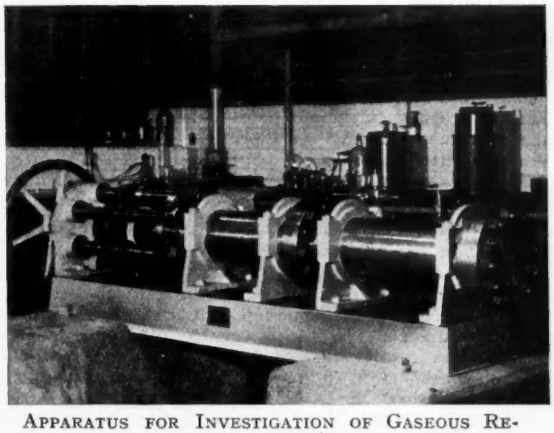
Research

It has been the constant policy of the Department to base its activities upon a bedrock of fundamental research; and it now has a highly trained staff of research assistants who, organised in groups, are continually prosecuting systematic lines of research which are carefully planned in advance. After his first two terms in the Department, the training of a would-be research student is commenced by attaching him to one or other of such groups for about a year, in order that he may be thoroughly disciplined both in the methods involved and the accuracy demanded in research operations, before he is allowed either to start off on his own or to become a group leader. In this way, not only is a continuity of skilled workers requisite to the systematic and uninterrupted investigation of selected subjects over a period of years assured, but also the student himself learns the value of close co-operation with others in research, as well as the benefits of leadership.

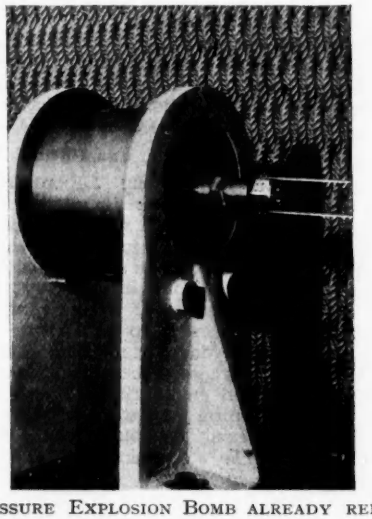
High Pressure Gas Research Apparatus at the Imperial College



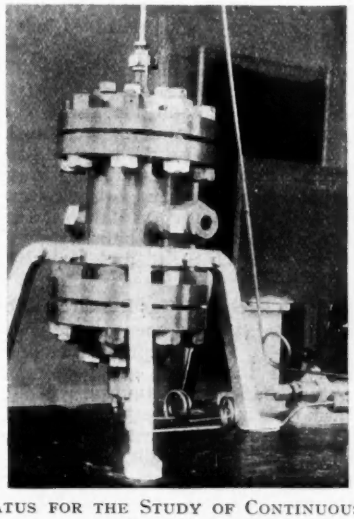
SUPER-PRESSURE EXPLOSION BOMB (WITHSTANDING PRESSURES UP TO 15,000 ATMOSPHERES), FOR WORK AT INITIAL PRESSURES UP TO 1,000 ATMOSPHERES, TOGETHER WITH ITS GAS FILLING SYSTEM AND OTHER ACCESSORIES.



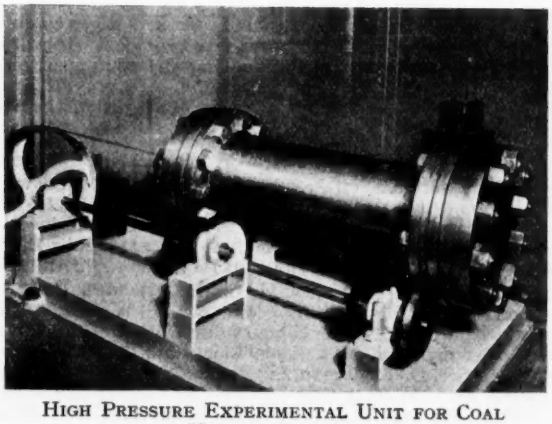
APPARATUS FOR INVESTIGATION OF GASEOUS REACTIONS UNDER PROGRESSIVELY INCREASING TEMPERATURES AND PRESSURES.



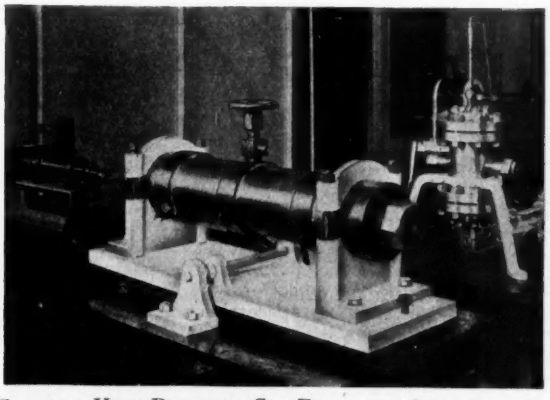
SUPER-PRESSURE EXPLOSION BOMB ALREADY REFERRED TQ , FOR FIRING GASEOUS EXPLOSIVE MIXTURES AT INITIAL PRESSURES UP TO 1,000 ATMOSPHERES.



APPARATUS FOR THE STUDY OF CONTINUOUS FLAMES AT HIGH PRESSURES.



HIGH PRESSURE EXPERIMENTAL UNIT FOR COAL HYDROGENATION.



TUBULAR HIGH PRESSURE GAS EXPLOSION BOMB, FITTED WITH QUARTZ WINDOWS.

Principal Lines of Research

A number of lines of fundamental work, calculated to direct students' minds to some of the basic problems of chemical industry, are being actively pursued in the Department. Investigations on the chemistry of coal are being carried out by a group of four research assistants, chiefly with the aid of grants of £1,000 per annum from the Fuel Research Board and £250 from the Sensible Heat Distillation Co., London. Brown coals, lignites, bituminous, semi-bituminous and anthracite coals from all parts of the world have been investigated. A benzene-pressure-extraction method has been devised by means of which not only the "primary oils" but also the "coking constituents" of coals can be extracted and isolated. Incidentally, much light has been thrown upon the chemical aspects of the maturing of coals.

Gaseous Combustion and Reactions at High Pressures

The work on gaseous combustion at high pressures, which is distinctive of the Department, has been continually in progress since the war, and at present four research assistants and about an equal number of research students-in-training are engaged upon it. Already a series of twelve papers embodying the results thereof (which have included the discovery of the "activation of nitrogen," and consequent large NO-formation, in CO-air explosions at high initial pressures) have appeared in the *Proceedings of the Royal Society*.

The first section of the research—dealing with CO-air, H_2-air, and CH_2-air, etc., explosions at initial pressures up to 200 atmospheres—has been in the main completed. The new equipment recently installed in the High Pressure Research Laboratories at a cost of £3,500 (defrayed out of grants received from Imperial Chemical Industries, Ltd. (£3,000) and the Gas Light and Coke Co. of London (£500)), provides (*inter alia*) for its extension to still higher initial pressures (200 to 1,000 atmospheres). In addition, this new equipment will enable systematic fundamental research work (already begun) to be developed upon catalytic reactions at pressures up to 500 atmospheres and temperatures up to 500° C., as well as upon coal-hydrogenation and other aspects of high pressure chemistry. The running costs of the work (amounting to over £2,000 per annum) are being chiefly defrayed out of annual grants made by the D.S.I.R. and Imperial Chemical Industries.

Equipment of the High Pressure Gas Research Laboratories

The following details of the equipment of the High Pressure Laboratory are of interest. The equipment includes: (*a*) Two 100-cub. ft. and seven 10-cub. ft. gas holders; two gas compressors (a 2-stage unit for 200 atmospheres and a 5-stage unit for 1,000 atmospheres); storage cylinders; pressure balances for calibrating standard Bourdon gauges, and apparatus for determining the compressibilities of gases. (*b*) Two experimental units for high pressure catalytic work up to 500° C. and 1,000 atmospheres; apparatus for determining equilibrium conditions in gas-vapour systems at high pressure up to 500° C.; experimental unit for maintaining electric arcs in gaseous media at high pressures. (*c*) High pressure gas explosion bombs with filling systems, Petavel manometers and spectograph for initial pressures up to 100, 200 and 1,000 atmospheres respectively. (*d*) Apparatus for investigation of continuous flames at pressures up to 100 atmospheres. (*e*) Apparatus for investigation of gaseous reactions under progressively increasing temperatures and pressures.

Photography of Gas Explosions

Photographic researches upon the development of gaseous explosions are now being prosecuted in the laboratories under the auspices of Nobels Explosives Co., Ltd., who are paying for the senior research assistant and other incidental expenses involved. Already four papers have been communicated to the Royal Society on the subject. Up to now the work has included the investigation of phenomena associated with the initial stages of gaseous explosions, and the influence of "shock waves" in speeding up combustion and developing detonation; and it is now being extended to the investigation of the influence of strong electrical and magnetic fields upon flame-propagation in gaseous explosions. A feature of this photographic work is the use of the Fraser high speed photographic machine, especially developed for the purpose.

Much fundamental (including spectrographic) work has been done (with the aid of two Gas Research Fellowships maintained by the Gas Light and Coke Co., and Radiation, Ltd., of London) on the mechanism of CO-combustion, particularly with reference to the influence of moisture thereon, which has been shown to be not so much chemical as electrical.

Blast Furnace Reactions

Research on the fundamental reactions involved in blast furnace iron smelting (a revision and extension of Lowthian Bell's classic work of fifty years ago) is being carried out under the auspices of the National Federation of Iron and Steel Manufacturers, who are paying the staff of four research assistants and other expenses involved. A first report of the results of this work, covering the interactions between the furnace fire and the ore at temperatures between 350° and 650° C. (and particularly the phenomenon of "carbon-deposition," $2CO = C + CO_2$, the optimum temperature for which is 450° C.), was published in the *Journal of the Iron and Steel Institute* in 1927.

Since then it has been extended to higher temperatures, and (*inter alia*) a new experimental furnace has been designed and installed which will enable the chemical phenomena of the blast furnace to be experimentally studied, not only at high temperatures, but also with gas-velocities equal to those actually attained in the blast furnace itself.

Electrical Aspects of Combustion

Investigations on gaseous combustion in electrical discharges and the electrical condition of surfaces during catalytic combustion are being carried out, under the direction of Assistant Professor G. I. Finch, by a group comprising one research assistant (provided by the D.S.I.R.) and three research students. Several papers embodying the results, which are of considerable fundamental interest as showing that combustion is conditioned by a prior "ionisation" of both the combustible gas and oxygen, have already been published in the *Proceedings of the Royal Society*.

Heat Transmission and Filtration

In the Chemical Engineering Laboratories, Professor Hinchley, assisted by three research students, is investigating fundamental problems connected with heat transmission and filtration. There is a great need for the problems of chemical plant design and operation to be systematically investigated from a fundamental standpoint in this way; and the contemplated further extensions of the present building and equipment would enable more to be done in this direction. It should also be noted that arrangements have been made with the Distillers Co. whereby they maintain a postgraduate studentship in chemical engineering, and also send certain members of their technical staff to spend a year working in the Chemical Engineering Section of the Imperial College under Professor Hinchley's direction.

Extension of Plant and Equipment Necessary

A point has now been reached when the activities—and more especially the research work—of the Department cannot be further extended and developed unless its building and equipment are enlarged. In all three Sections of the Department there is plenty of work "lying on the doorstep," so to speak, and there are postgraduate workers eager to do it, if such further accommodation can be provided. It will be necessary either to extend the building and equipment or to refuse such further work and admission. To provide at all adequately for the development of the work within the next five years a capital expenditure of £50,000 will be necessary.

Exhibition of Work

At the exhibition, on Monday, of the experimental work and equipment of the department of chemical technology of the Imperial College, a large and distinguished gathering was present. Those who accepted invitations included Sir David Milne-Watson, Sir Thomas Holland, Professor A. J. Allmand, Sir William Bragg, Professor H. C. H. Carpenter, Professor Joceyln Thorpe, Sir Dugald Clerk, Mr. E. V. Evans, Mr. C. S. Garland, Sir Alexander Gibb, Professor W. E. Gibbs, Mr. F. W. Goodenough, Dr. R. Lessing, Lieut.-Col. G. T. C. Moore-Brabazon, Dr. G. T. Morgan, Sir Frederic Nathan, Lieut.-Col. G. P. Pollitt, Mr. J. Arthur Reavell, Sir Robert Robertson, Mr. H. T. Tizard, Professor H. E. Armstrong, Dr. E. F. Armstrong, Mr. E. C. Evans.

Chemical Plant and Engineering Products

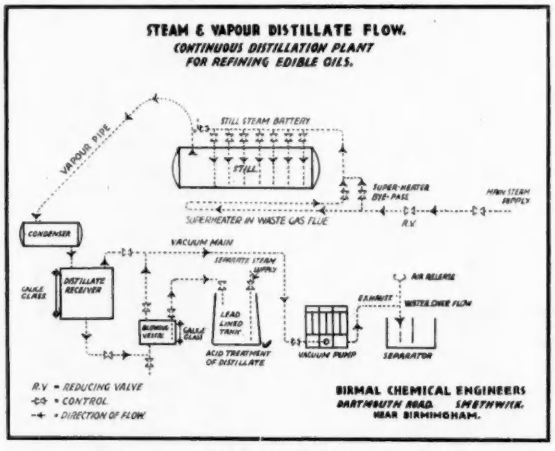
Notes on Some Modern Manufactures

From time to time notes appear in this journal on chemical plant and engineering products of interest. The account given below shows the present trend of the plant manufacturing industry, indicating those directions in which the position is being consolidated, and those in which new ground is being broken.

Aluminium Plant

ALUMINIUM or aluminium alloy plant is suitable for processes of manufacture, for storage, and for transport in numerous departments of the chemical and allied industries, including those concerned with edible oils and fats, foodstuffs, jams, margarine, milk, chocolate, gelatine, sugar, yeast, beer, dyestuffs, rubber, lacquers, varnishes, pure pharmaceutical products, etc.

Birmal Chemical Engineers, of Dartmouth Road, Smethwick, manufacture numerous forms of plant and equipment in aluminium or aluminium alloys, including the following:—(1) Vessels of various dimensions constructed in the cast aluminium alloy "Birmalite," of proved capacity to withstand direct gas firing up to a temperature of 300° C. for distillation and high temperature treatment processes at atmospheric pressure or at high vacuum; (2) All types of welded vessels in sheet aluminium, open, closed and jacketed for steam heating as desired, such as storage tanks for edible or other products; transportation vessels, as wheel trucks, railway tank wagons, milk churns, kegs or drums, and hand carried vessels; vacuum vessels, distillate receivers, blowing vessels, deodorisers, melting pans, large cooking vessels, pasteurising vessels, fermenting tanks, churns, trays, etc.; (3) All types of internal fittings for the above-mentioned vessels, such as steam heating coils, open steam supplying coils, baffling devices and stirring gear. These can be made

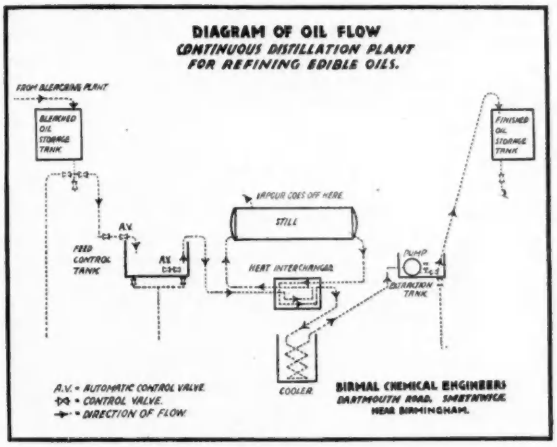


STEAM AND VAPOUR DISTILLATE FLOW.

in pure aluminium and in many cases cast in the same alloy of which the vessel is constructed, in order to maintain the same type of metal throughout the apparatus; (4) Special types of condensers, coolers, and heat interchanging apparatus in aluminium, aluminium alloys, or other special alloys.

Birmal Chemical Engineers are also equipped for the development, design and construction of complete plants for chemical processes of which the essential parts can be most suitably made in aluminium or an aluminium alloy, supplying all auxiliary plant necessary, and erecting and starting up the complete unit or units.

One of the special activities of Birmal Chemical Engineers is in connection with a patented continuous distillation process and plant for the refining of edible oils. Complete plants are supplied and licenses granted for their operation. In the process in question (which is illustrated in the diagrams shown herewith), crude oil, after bleaching, is distilled with steam in vacuo, free fatty acids and odoriferous substances being removed, with the direct and continuous production of a high-grade, neutral, edible oil and a by-product acid oil. The advantages of the process are obvious. The distillation plant, consisting of storage tanks, feed control tank, heat interchanger, still, cooler, extraction tank, and vacuum condensing system, is built almost entirely in aluminium, and



OIL FLOW.

a special aluminium alloy which has proved its capacity to withstand the action of free fatty acids at high temperature. In addition, bleaching and gas-producing plant for the process are supplied. Large scale plants of the above type have been in use in one of the largest refineries in the country for over four years.

Filtration Plant

No single type of filter has yet been designed that will meet all the different and widely varying filtration problems encountered in the chemical, metallurgical, sugar, oil, and other industries. Oliver United Filters Inc., of 150, Southampton Row, London, W.C., have therefore developed various

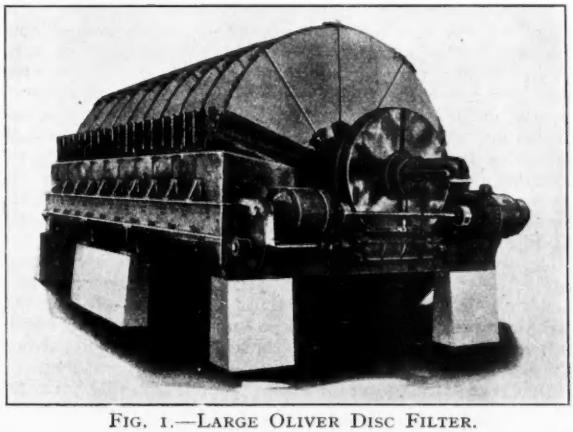


FIG. 1.—LARGE OLIVER DISC FILTER.

general types, each built in a variety of sizes, in order to provide the most practical solution for each problem. All this plant is built in Bradford.

For example, the Oliver disc filter (illustrated in Fig. 1) is a vacuum filter. Vacuum filters are most successfully employed for the filtration or dewatering of products containing a reasonable percentage of fairly free-filtering suspended solids

that do not tend to clog the pores of the cloth excessively, such as activated carbons and clays, ammonium nitrate, barium sulphate, calcium carbonate, caustic soda, dyes, gypsum, lithopone, manganese dioxide, pigments, sewage, sodium chloride and numerous other products. The Oliver disc filter readily lends itself to acid proofing and other special constructions, and the manufacturers have developed a number of special types at the request of various customers. One of the important advantages of the Oliver disc filter is that it gives a large filtration area for a small floor space.

The Kelly filter (Fig. 2) is of a type quite different from the above, being a pressure filter. The Kelly filter consists primarily of a steel shell enclosing a number of frames or leaves covered with a filtering medium and supported by a carriage. The material to be filtered enters the shell under pressure. The pressure, which should not exceed 60 lb. per square inch, forces the clear liquid through a filtering cloth and out of the filter through suitable passages. The solid material remains in the form of a cake covering the outside surface of the filter cloth. At the conclusion of the filtering period, the carriage is drawn out of the shell and the cake, which has accumulated, is discharged.

Yet another product of the company is the Sweetland pressure filter (stationary leaf type). This filter is so designed

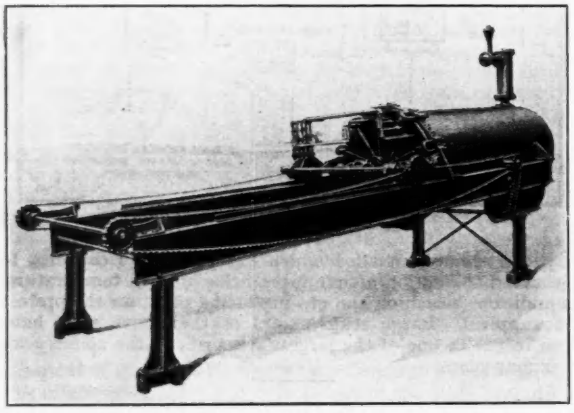


FIG. 2.—HAND OPERATED KELLY FILTER, CLOSED AND LOCKED, READY FOR FILTERING.

that the solids are deposited in an even layer on the outside surfaces of a series of bags supported on a plurality of filter elements (called leaves) which are suspended within a pressure-tight shell. The filter leaves are so spaced that adjacent cakes of solids do not build together or touch each other. This design makes possible two extremely important objects. The first is automatic discharge of the solids without hand labour. Where the solids are to be discharged from the filter in as dry a condition as possible, for example, the filter is quickly cleaned by swinging open the lower body to expose the leaves, with their accumulation of cake. Low-pressure air is blown back through the discharge piping to inflate the cloth bags covering the filter leaves and thus dislodge the cakes which have formed thereon. The solids slide off the leaves into a suitable hopper or car which is placed beneath the filter.

The second advantage of the Sweetland filter is thorough and efficient washing of the cake. The extremely high washing efficiency of the Sweetland filter is due to the fact that the cakes are not allowed to build up solid from leaf to leaf, and the total surface of the cakes is therefore always exposed to liquid pressure during filtration and washing.

The Sweetland filter holds a prominent place in the machinery used in the manufacture of cane and beet sugars, syrups, beverages, metallurgical products, oils (mineral and vegetable), chemicals and dyestuffs, the list of products handled including absorption oils, acetic acid, casein, coal tar by-products, cocoa butter, kerosene, laundry waste water, mucilages, oleic acid, pepsin, starch, sugar liquors, etc., among numerous others.

Other products of interest manufactured by the company are Oliver salt type filters, in which it is claimed that salt and similar materials can be dewatered to a lower moisture content than in centrifugals; Oliver cast-iron filters, Oliver Borden thickeners, and Sweetland thickeners.

Cast-Iron Enamelled Plant

SILICA enamel is in many ways an ideal material. It is resistant to all acids except hydrofluoric, even at ebullition. Danto-Rogeat and Co., manufacture cast-iron plant and apparatus lined with an enamel consisting of pure silica, free from all traces of metallic oxides, which are a cause of deterioration. The method of manufacture is such that the enamel has not only the characteristic acid-proof properties, but is also insoluble in weak alkaline solutions, thus rendering possible the use of the plant in most chemical processes. The Danto-Rogeat enamel is not decomposed by heat. Kettles lined with it could be easily heated to 1,000 deg. C. without injury to the enamel, were it not for the supporting cast-iron base, which approaches the softening point at this temperature. The above-specified properties would render silica enamel an ideal material for linings, if its exceedingly low coefficient of expansion (0.00000054) and slow conductivity of heat did not entail great difficulties in its application. Owing to these qualities, cast iron is practically the only metal which may be safely enamelled with pure silica, and even this is possible only by taking special and extremely minute precautions.

The history of the firm of Danto-Rogeat is of great interest. It has been in existence for nearly a century, having been founded in 1836. It has enjoyed the very rare position of acting as appointed supplier of plant to numerous chemical and dyestuff manufacturers in Germany, including Bayer and Co., the Badische Anilin und Soda-Fabrik, Casella, de Haen, Meister Lucius und Brüning, Boehringer, etc.; while its products have also had a large sale in numerous other countries. During the war the factories of the company, at Lyons, were

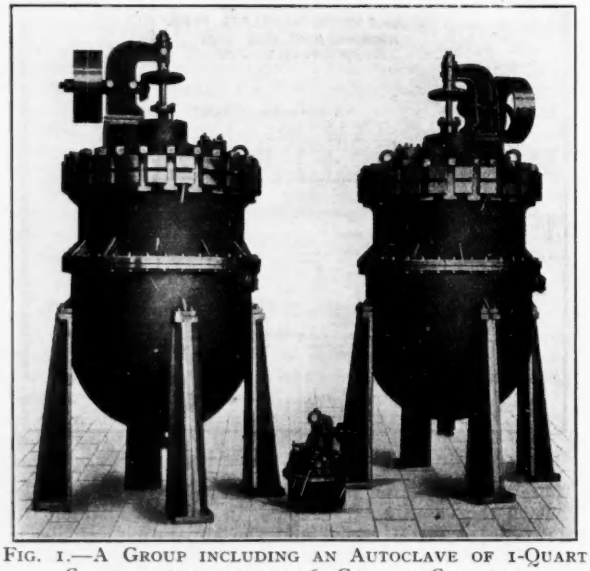


FIG. 1.—A GROUP INCLUDING AN AUTOCLAVE OF 1-QUART CAPACITY AND TWO OF 260-GALLONS CAPACITY.

of great service, plant being supplied in large quantities to the French Government and its Allies. After the war, in 1920 and 1921, in spite of all that had occurred, German firms sent orders for enamelled iron plant to the company—a remarkable testimony to its efficiency. Another interesting fact is the position with regard to Italy. Of late years, the latter country has been very jealous of its independence, and has carefully studied the question of creating an enamelling industry of its own. In spite of this, Italian manufacturers buy their enamelled plant from the Danto-Rogeat company. In the United States, a company which will carry out the enamelling of very large plant by the Danto-Rogeat method is in course of constitution.

The range of products of the Danto-Rogeat Co. (supplied by

H. Sloog, of 45, Great Marlborough Street, London, W.1) is very large. It includes, for example, autoclaves of various kinds and sizes, Fig. 1 showing a small autoclave of 1 quart capacity between two others, each of 260 gallons capacity. The autoclaves will withstand pressures as high as 450 lb., and are widely used in the manufacture of numerous organic, pharmaceutical and photographic products, synthetic perfumes, etc., *e.g.*, dimethylaniline, β-naphthol, ethylaniline, methyldiphenylamine, diethylaminophenol, metol, the methylation of pyrazolone to antipyrine, etc. Reaction kettles of various capacities (12.5 to 625 gallons are also made, Fig. 2

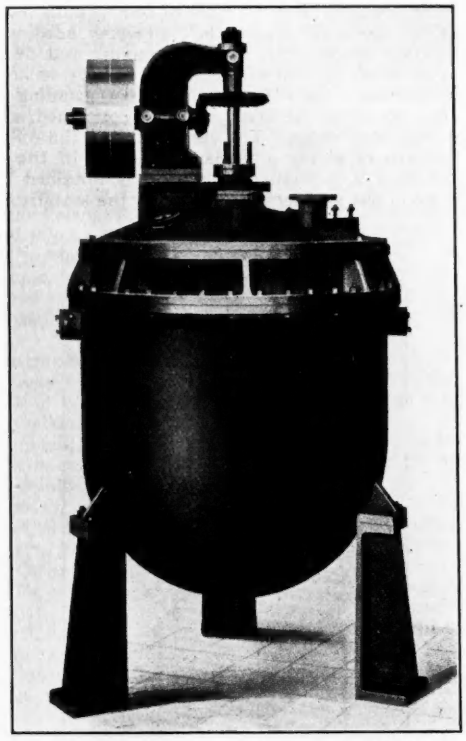


FIG. 2.—300-GALLON REACTION KETTLE (" GRIGNARD " TYPE)

showing a very popular type, the 300 gallon " Grignard " kettle (steam-jacketed) used in the manufacture of aspirin, Indanthrene Yellow, Victoria Blue, dimethyl sulphate, arsphenamine, etc.

Other products of the Danto-Rogeat company are jacketed kettles of numerous types (including the tilting type); a great variety of tanks, containers, and minor accessories (the tanks, for example, in diameters of 12 to 68 inches); rectangular vats; vats for dyers; rectangular crystallising pans; oval vats; blow-cases of various types and sizes, and for various pressures; jacketed evaporating tanks; stills; laboratory apparatus of various kinds, and so on.

The company also manufactures lead- and tin-lined equipment.

Non-Corrodible Evaporation Plant

IT is pleasing to learn that there are evidences of increased activity in many branches of the chemical plant industry. The Kestner Co. have been receiving an increasing number of inquiries, of which a high proportion have materialised. This company, who are well-known as experts in evaporation problems, have been making great progress in construction of plant dealing with liquors corrosive to the usual constructional materials.

The increasing importance of recovery plants in the economic production of any article has resulted in the extended use of the Kestner patent acid evaporator. This apparatus is constructed in lead alloy contact throughout, and works under vacuum. In the case of parchment paper and artificial silk works, the saving obtained by recovering the spent acid liquors has resulted in its almost universal adoption. Evaporators have been built having stainless steel contact throughout, as well as special stills, autoclaves, process tanks and general chemical plant. Great interest has been shown in the Kestner patent spray drier, and a number of installations have been made. The plant installed at the company's work has been fully occupied, numerous tests having been carried out for those interested in the applications of the process, and it is anticipated that a large number of plants will be operating during the present year. The possibility of recovering various waste products by the use of this method has received much attention, and where waste flue gases are available the low cost of evaporation renders possible the production of certain materials in a powdered form, which hitherto has been prevented by the high costs of drying.

The work which the company has carried out in connection with solid absorbents for solvent recovery, air drying and oil refining, has been advanced by the production of several new solid absorbents. Silica gel of three different grades is now available, and also a new material with a very high capacity for water absorption at a very low cost.

The Kestner Electroil System

A comparatively new development which is of special interest is the Kestner Electroil System. Oil heated by electric elements is used to convey heat at high temperature and low pressure to any form of vessel fitted with a jacket or heating coil, the principle being similar to the company's well-known Merrill patent oil heating system. These systems entirely do away with high pressure steam for heating purposes. When a number of vessels have to be heated a central Electroil unit is installed, but when there is only one vessel, the Electroil system can be applied to this vessel in the jacket itself, making a self-contained unit which, if desired, can be mounted on wheels and run to various points in a works. The combination in the system of accurate temperature control and absence of high pressure ensured by the oil, with the extreme convenience of electricity as heating medium, make it an attractive proposition in high temperature processes of all kinds.

Further particulars of the above and other chemical plant can be obtained from the Kestner Evaporator and Engineering Co., Ltd., of 5, Grosvenor Gardens, Westminster, S.W.1.

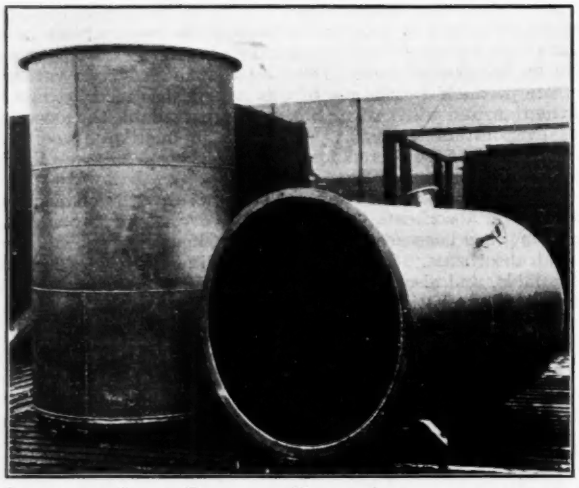
Stainlessly Welded Steel Work

THE necessity for stainless steel vessels to be be equally stainless in plate and joint is widely recognised, while maximum strength should also be maintained in jointing methods.

STAINLESS STEEL POT FOR CONFECTIONERY.

Stainlessly welded plate work for chemical plant, in stainless steel and other non-corrodible alloys, is supplied by Thompson Bros. (Bilston), Ltd., of Bradley Engineering Works, Bilston,

Staffs. From tests carried out on the methods of production adopted by Thompson Bros., it has been found that the chemical composition of the weld is throughout consistent with the parent metal, all characteristics of the latter being reproduced. The company maintain a skilled laboratory



STAYBRITE STEEL PANS FOR NITRIC ACID, 4 FT. DIAMETER BY 6 FT. HEIGHT, THICKNESS ⅛ IN., STAINLESSLY WELDED BY THOMPSON BROS. (BILSTON), LTD. PART OF AN ORDER FOR NINE.

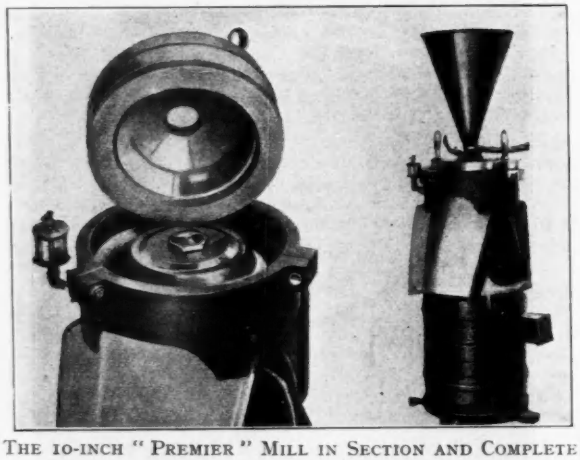
staff, which investigates every problem sent by inquirers, and experiments are constantly being conducted in the building up of plant from all types of non-corrodible metals.

In addition, the company supply special tanks lined with ebonite and other such materials. They are exhibiting at the British Industries Fair, Castle Bromwich, where these points are fully illustrated.

The two illustrations shown herewith give some idea of the work of the firm in welded stainless steel.

Colloid Mills

COLLOID mills have now been available to manufacturers for about six or seven years, and sufficient time has elapsed for a general idea of their capabilities to be obtained. Most manufacturers of colloid mills were optimistic in their prophecies

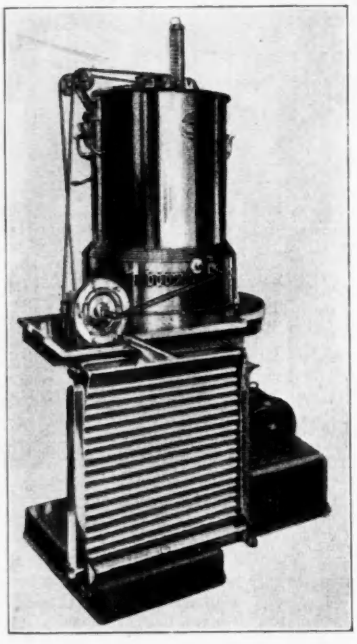


THE 10-INCH "PREMIER" MILL IN SECTION AND COMPLETE.

and statements, but to-day very few extravagant claims are made.

So far as actual grinding is concerned, the difficulty about grinding anything but the softest materials or pigments is probably due to the fact that it is impossible in a colloid mill to apply considerable energy to a small quantity of material without generating heat. In any mill, the bulk of the energy is dissipated in the form of heat, and it is found impossible to dissipate this heat and carry it away from the material at a sufficiently rapid rate. Water jackets are a help, but when one is putting 8 or 10 horse power of energy into a quarter of a cubic centimeter or so of material, the heat is produced within the material and cannot be conducted away rapidly. It is this fact which has put a limiting factor on the design of colloid mills. Far better grinding could be obtained if this heating difficulty could be overcome, and this has been shown by means of many experiments in which a small quantity of material has been treated and the machine stopped before troublesome heating took place.

Generally speaking, the activities of colloid mills have been confined to problems under the following headings: (1) Emulsification proper; (2) intensive mixing and destroying granular structure in semi-solids and pastes; (3) as an apparatus for wetting; and (4) for the actual grinding of soft materials. So far as the first heading is concerned, excellent progress has been made. The colloid mill is the only satisfactory means of giving a perfect dispersion of the phases. As to whether a permanent emulsion is obtained or not, depends upon the satisfactory nature of the stabiliser which



THE 15-GALLON "PREMIER" EMULSIFYING UNIT FOR PHARMACEUTICAL WORK.

has been added. The first essential in a colloid mill for emulsification purposes is simplicity. No object is gained in utilising very high speeds, as experiments will show, and a peripheral speed of 12,000 ft. per minute is all that is necessary for the manufacture of most commercial emulsions. An emulsion machine must be susceptible of rapid and easy cleaning, simple adjustment and running for a year or more without any attention, replacements or repairs. Furthermore, its power consumption must be small. On a large machine the power consumption should not exceed one horse power for 75 gallons of emulsion of a limpid nature, or one horse power to 50 gallons of emulsion of a fair viscosity. These figures show that emulsion processes are cheap so far as the mechanical side is concerned. The wear and tear and depreciation on a colloid mill is negligible.

Manufacturers of all kinds of commodities are beginning to realise that the texture of a number of products can be improved enormously by passage through some simple type of colloid mill. Examples of these are soft soap, shaving soaps, tooth pastes, cosmetics, etc. of all kinds, and in many cases this has not been made a separate operation but the earlier stages of the process of manufacture have been incorporated into the general passage of all constituents through

the colloid mill. Manufacturers of colloid mills find a considerable increase throughout the country in applications of this kind.

The manufacture of ordinary grades of paints and enamels by means of the average colloid mill is little more than a wetting process. It might be said that this is the case in the manufacture of the average paint and enamel by conventional methods, but the paint manufacturer would probably not agree to such a statement. To the manufacturer of the cheaper grades of paint and enamel, the colloid mill has a big field, but the prejudice against its use in this direction is considerable. Here again one of the biggest limitations is that of heat production.

The colloid mill has a big future under this heading, and is particularly valuable for the grinding of colour pastes in oil and water. It has been found particularly useful in the textile industry for this purpose, and its use is rapidly increasing.

The first British colloid mill to be manufactured on a commercial basis was the Premier Mill, and this machine, made by Burt Boulton and Haywood, Ltd., of Prince Regent's Wharf, Silvertown, E.16, has stood the test of time throughout the world during the last seven years. It is a very simple mill, and two of its various forms are portrayed in the accompanying pictures. A machine is made for every purpose from the manufacture of delicate and expensive cosmetics to the making of road dressings in the tropics. A special unit is even used on ocean liners for the regeneration of milk and cream.

The manufacturers of these mills have research laboratories where the problems of their clients are investigated, and where a wealth of information regarding such things as stabilisers, etc. is available for users of the Premier Mill.

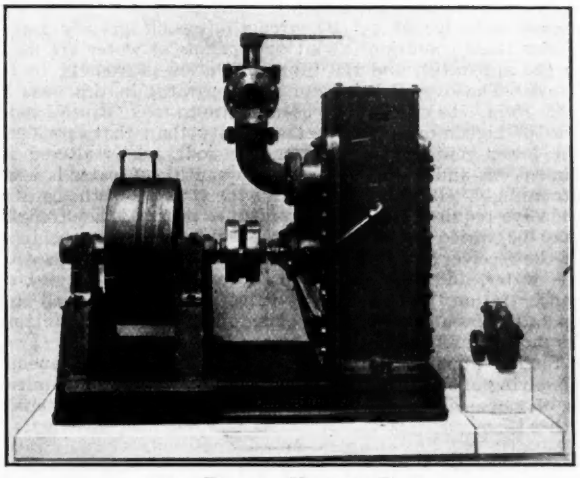
As an example, the 5 in. Premier paste mill may be described. The mill is of the vertical type, direct driven by means of vertical spindle motor, through a flexible coupling. The base of the motor is arranged to form a pedestal, for mounting direct on to floor. The body of the mill is of close-grained, best quality grey cast iron, having a specially large and steep-angled outlet to assist rapid discharge and easy cleaning. The outlet is flanged and can be bolted direct to pipe or vessel if required. The rotor is manufactured from special quality hard steel, and is attached to a mild steel spindle, which rotates in special radial thrust ball bearings housed in the body. The stator, housed in the adjustable head of the machine, is also of special hard steel, and is attached to head by means of set screws to enable it to be renewed if found necessary. The head of the machine is cast hollow to form water or low pressure steam jacket and is fitted with suitable connections for the purpose. The mill is fed by means of hopper or container, and can also be direct coupled to rotary feed pump. The interior portions of the mill are made stainless and rustless, being lined with nickel by the Fescolising process. This mill is specially designed to handle viscous fluids and pastes.

Acid Valves, Pumps, etc.

Acid valves, pumps, elevators, taps, automatic ejectors for saturators, lead burning apparatus, castings in gunmetal, phosphor bronze, and white metal, and finished brass products of every description are manufactured by Cortin and Corking, Ltd., of Mushroom Brass Works, St. Lawrence Road, Newcastle-upon-Tyne. Individual products include patent full bore acid valves for thick and muddy liquids, acid or other corrosive fluids, supplying or exhausting air or gases, etc.; non-rotative acid valves, improved valves for acid eggs; universal acid, gas and water valves; acid taps of various types; chamber cocks; acid resisting gauges for tanks; ebonite fittings for hydrochloric, nitric and acetic acids; acid sluice valves, etc.

Vacuum Pumps

There are a very few branches of chemical industry in which the use of a vacuum pump is not essential, and it is obviously important that such a pump should be of the highest efficiency. In the past it has been only possible to obtain the highest vacuum with a laboratory pump, but now pumps of factory size are made capable of giving the same high degree of vacuum as the smaller sizes. The illustration herewith shows a 12 in. pump of the rotary type which has a volume swept capacity of 110 cubic feet of free air per minute, when running at 300 r.p.m., and this pump is capable of giving a vacuum of 1/100th of a millimetre off perfect. Bearing in mind that this is a single stage pump, its performance is noteworthy.



12 in. Rotary Vacuum Type.

The pump is supplied by the Pulsometer Engineering Co., Ltd., of Nine Elms Iron Works, Reading. It is frequently necessary to use special types of pumps for various purposes. For instance, for the highest possible vacuum on a dry circuit a duplex pump in series would be required, whereas in order to get the best results on a wet circuit a condenser type of pump is advisable. Further, for desiccation and distillation another form of pump is used, with which far better results are obtained than in any other manner.

A Caustic Soda Dissolver

The process of producing solutions of various solid bodies is often attended by various difficulties. These are particularly noticeable in making caustic soda solutions. The breaking up of the fused mass is here a difficult and hazardous operation. Many dissolving processes are accelerated by the application of heat and mechanical agitation. In the case of caustic soda, mechanical agitation is more or less waste of energy, and the addition of live steam (as a source of heat) must necessarily reduce the ultimate concentration of the solution obtained.

The Caustic Soda Dissolver.

These disadvantages are eliminated in the new patented caustic soda dissolver shown herewith, a very ingenious piece of plant supplied by F. Weinreb, of 16–17, Devonshire Square, London, E.C.2. With this apparatus it is merely necessary to make a few holes in the drum and place the latter in the upper container, which is filled with water to a level above the edge of the inner barrel. The dissolving action then commences automatically, and the solution of caustic soda, as it is produced sinks through the connecting pipe (on account of its higher specific gravity) to collect at the bottom of the lower container. Here it presses non-saturated water (or less saturated solution) through the annular space

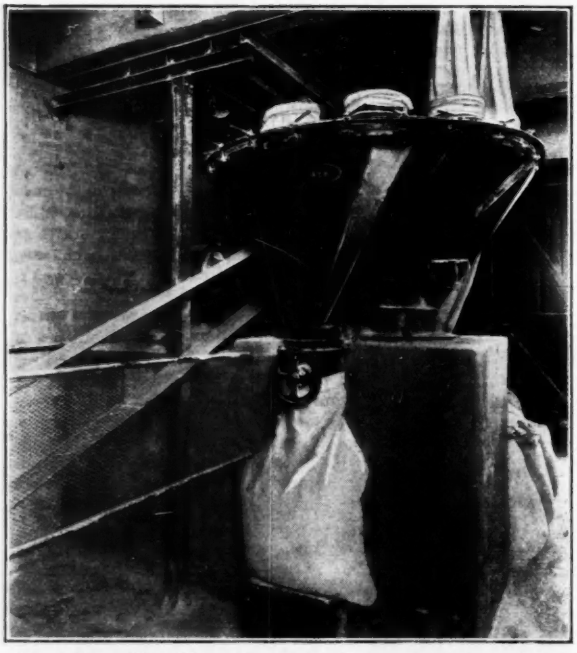
the centre pipe and the outer pipe so that this reaches the edge of the inner barrel, where it continues to exert its dissolving action upon the bulk of the caustic soda remaining. The dissolving process carried out in this manner is further accelerated by the heat which is produced.

The apparatus illustrated is designed to take the usual 6 cwt. caustic soda drum, and is standardised to produce a caustic soda lye of 25° Bé strength (specific gravity 1·21). Under these conditions about 120 gallons of water are used in the apparatus, and the time of solution is from 1¼ to 1½ hours. The overall height of the appaiatus in this case is 9 ft. 10 in. In cases where users desire to make caustic soda lyes of higher or lower specific gravity than that specified, the lower container for the caustic soda lye is altered in dimensions and a larger or smaller quantity of water is used accordingly. In other cases where the strength of the caustic soda lye required may vary from time to time, the strength may be varied by controlling the valve shown at the base of the receiver; this valve regulates the circulating speed of the water, and thus can be used to control the degree of concentration required. The valve can be arranged for operation by an independent outside handwheel transmitting its movement through bevel gears to the valve.

Similar apparatus is being supplied for the simultaneous dissolving of six drums weighing 6 cwt. each. The apparatus is, of course, also applicable to the dissolving of solid materials other than caustic soda.

A Grinding and Blending Mill

THE Kek patent grinding and blending mill is especially adapted for fine grinding, and as no screens or grids are used, materials having a high moisture content, or even material of a pasty nature, can be successfully treated without risk of clogging. As a blending mill the Kek mill is highly efficient, and frequently it is possible to grind and blend two

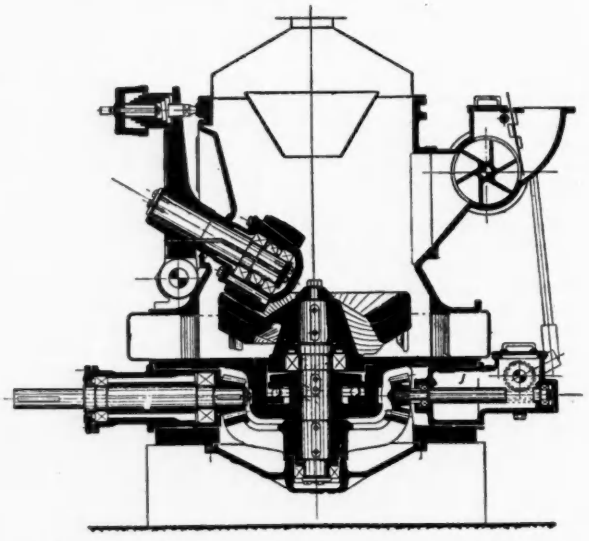


NO. 1 SIZE KEK MILL GRINDING GUMS AT LONDON WORKS.

or more materials at one operation, thereby saving plant, space, power and labour. Inquiries on all grinding problems should be addressed to the manufacturers, the Buffoline Noiseless Gear Co., Ltd., of 27, Lots Road, Chelsea, London, S.W.10, where an up-to-date demonstration station is maintained for carrying out trials on prospective clients' own materials. Other products of the company include machine cut gearing of every description, including spur, bevel, spiral, worms, worm wheels, worm and helical reducing gears, raw hide and paper pinions.

A Grinding and Pulverising Mill

THE latest publication of International Combustion, Ltd., from the grinding and pulverising offices, 11, Southampton Row, London, deals with their Raymond-Lopulco Mill. The construction of the mill, shown in vertical section in the accompanying illustration, represents a ring roll mill, with a horizontally revolving grinding ring, against which work a number of spring-supported rolls, rotating on pivotally supported shafts and grinding a layer of the material to be pulverised upon the said rotating grinding ring, in direct combination with an air-current separation of the pulverised material. The dished grinding ring being centrally supported by a strong vertical shaft is revolving in a horizontal plane and drives the rollers by frictional contact with the layer of material, constantly passing over the surface of the grinding ring. The radical improvements embodied in the mill include continuity of operation, complete outside lubrication, and lubrication automatically pump fed.



VERTICAL SECTION OF RAYMOND-LOPULCO MILL.

Forged Steel Valves for High Pressures

FORGED steel valves for high pressures and temperatures are manufactured by Gummers, Ltd., of Effingham Valve Works, Rotherham. The following details regarding these valves are of interest: They are made entirely from British materials; designed for working pressures up to 500 lb. per square inch, and temperature up to 800° F.; Farronic valves and seats are used; the spindles are of large cross sectional area and of Monel metal; the glands are deep and easily accessible, and packed with specially prepared asbestos rings; all flanges are turned on back as well as face and edge; a large and deep square is put on all spindles to enable extended spindles to to be used without difficulty. They are full bore right through the valve; the valves are machined from the solid drop stamping. No welding is employed.

With regard to the Farronic metal mentioned above, Gummers, Ltd., describe this alloy as one of their specialities. It is a nickel copper alloy of high nickel content, and is extremely hard and wears well. It resists the cutting action of high temperature superheated steam. Its principal feature for steam valve work is that it does not soften under high temperature, and it is not readily affected by the common acids. The expansion of this metal due to temperature follows very closely that of forged steel, making it pre-eminently suitable for seatings, etc., in forged steel valves. This metal is in demand by the leading engineering concerns in this country for service on high temperature steam. The average Brinell hardness number taken over a large number of tests is 240 points, which is approximately 25 points harder than 4¼ per cent. nickel steel.

The Hire-Purchase of Machinery

It is hardly too much to say that the recent development of instalment selling marks the opening of a new era in business economics. With statistics from America before us from which the element of risk may be assessed to a nicety; with the opinions of the giants of industry put before us in the daily Press; with the knowledge that unemployment is ultimately caused by lack of credit somewhere; it is small wonder that there is a growing belief in the extended use of this form of credit.

Many of the readers of this journal already know that some little time ago Sir Ernest Benn, Chairman of Benn Brothers, Ltd., organised and became chairman of the Trade Promotion Trust, Ltd., the original function of which was the provision of facilities to retail house furnishers and others to meet the competition of the widely advertised hire-purchase firms. The success of this enterprise has led the directors of the Trust to extend its activities to the machinery trades.

In these days of keen competition it becomes increasingly important to employ the best and most efficient machinery and plant which is procurable, either for the purpose of reducing costs, improving the product, or both. Plant wears out, new inventions appear, and manufacturers and others are constantly confronted with the problem of finance, failure to solve which means certain restriction in meeting competition, and often complete disaster.

The capital outlay involved in the purchase outright of plant, machinery, and technical equipment in general is often out of the question, and those firms to whom such equipment is an absolute necessity are driven, as an alternative, to secure "new money" by the issue of debentures, and the raising of loans at such a cost as to be entirely out of proportion either to the real value of the money itself or to the real benefit which can, with the most sanguine expectations, accrue to the business.

To those who are sceptical as to the wisdom underlying the fuller use of consumer-credit as it applies to the private individual, it would perhaps not be out of place to point out that the aspect of the system as it applies to the machinery of production is in a most important respect different from ordinary consumer-credit. Producer-credit, the name by which the purchase by instalments of machinery and productive equipment generally is known, is far more difficult to argue against than is consumer-credit, for, indeed, there is no charge of waste or extravagance to be levelled against the purchaser, who, on the contrary, requires machinery for the purposes of greater economy. The object of the Trade Promotion Trust is to provide the necessary facilities on a fair and reasonable basis. Immediate payment is made to the supplier.

In order to initiate a transaction the following particulars should be sent to the Manager, Trade Promotion Trust, Ltd., Bouverie House, 154, Fleet Street, London, E.C.4: (1) Name and address of business of proposed hirer; (2) details and price of goods for proposed hire-purchase; (3) the proposed period of the hire-purchase; and (4) the amount of the first payment to be made.

Appeal by Chemical Manufacturers Dismissed

In a King's Bench Divisional Court on Wednesday, January 16, Lords Justices Shearman and Acton had before them the case of Simons *v.* Smith Hughes and Co., Ltd., which was an appeal by the defendants, Smith Hughes and Co., Ltd., of College Hill, London, from a judgment of Judge Moore, of the Southwark County Court, in favour of the plaintiff, John Simons, of Leroy Street, for £70. The plaintiff is a baking powder manufacturer, and the defendants are chemical manufacturers. The plaintiff's claim was in respect of a ton of acid calcium phosphate, supplied by the defendants, which plaintiff used in the manufacture of baking powder. Plaintiff alleged that the chemical supplied contained arsenic, and in consequence a grocer, to whom plaintiff sold baking powder, was convicted and fined, and plaintiff paid the fine and costs of the defence. Plaintiff had also to destroy the remainder of the acid phosphate.

The appellants appealed against the judgment and asked for a new trial on the ground that the hearing was unsatisfactory and also that new evidence had emerged since the hearing, which showed that the basis upon which the county court judge decided the case was entirely wrong.

The court, after hearing counsel, dismissed the appeal, holding that the case was a question of fact for the judge in the court below, and that there was no evidence that the judge had misdirected himself in refusing to grant a new trial.

Oil from Coal

Refining Company in Course of Formation

A company, Petroleum Refineries, Ltd., is in course of formation for the purpose of establishing plant on the Humber for the refining of coal oil, and an initial contract has been placed with Low Temperature Carbonisation, Ltd., the Yorkshire coal distillation concern, for the supply of a minimum amount of crude oil. Further contracts of a similar nature are in course of negotiation. The capital of the new company will be £450,000, and the capacity of the refinery will be about 420,000 gallons of petrol and other oil products a week. The directors include Lieut.-Col. W. A. Bristow, managing director of Low Temperature Carbonisation, Ltd., and Mr. E. Franklin Evans, managing director of the Petroleum Storage and Finance Corporation.

The supply of smokeless fuel and its oil by-products will be further increased by the erection of a large Coalite plant at Greenwich by the South Metropolitan Gas Co., and of a further new plant on the banks of the Thames by London Coalite, Ltd. One British low temperature carbonisation plant alone has produced 1,745,000 gallons of crude oil, and recovered 192,000 gallons of motor spirit from the gas, during eighteen months of working, and it is claimed that, had it been possible to "crack" all the oils recovered, a total of 715,500 gallons of petrol would have been produced. The Budget preference to British petrol on this quantity would have been nearly £12,000.

The exemption of such oils from new taxation is expected to give a big fillip to the petrol industry. It is proposed to use the Gyro vapour-phase process of refining—already in unqualified success in the United States and Canada. In turn, the development of the refining industry, which will give an enhanced value to the by-products, is expected to have a highly stimulating effect on the scientific treatment of coal and the production of smokeless fuel.

Ramsay Memorial Fellowships

The Ramsay Fellowships in Chemical Science—British, Dominion and Foreign—which are tenable in the Universities and University Colleges of the United Kingdom, are at present held by the following. In each case the University or College which has been selected by the Fellow for his research is given: British Fellowships: Dr. A. M. Taylor (University of Cambridge), Dr. R. H. Purcell (Imperial College of Science and Technology, London). Glasgow Fellowships: Dr. Peter Maitland (University of Cambridge), Miss Irene McAlpine (Special Fellowship, University of Glasgow). American Fellowship: Dr. R. H. Dalton (University of Oxford). Canadian Fellowship: Dr. W. H. Barnes (Royal Institution, London). Danish Fellowship: Miss A. M. Unmack (University of Oxford). Greek Fellowship: Dr. D. Nider (University College, London). Japanese Fellowship: Dr. Yohei Yamaguchi (University College, London). Netherland Fellowship: Dr. H. Bienfait (Imperial College of Science and Technology, London). Swedish Fellowship: Mr. H. Liander (University College, London). Swiss Fellowship: Dr. G. Schwarzenbach (University College, London). The total value of the annual amount of the Fellowships that is awarded is approximately £4,000, of which about £3,000 is provided by grants from Dominion and Foreign sources.

Action Under Employers' Liability Act

At the Shoreditch County Court, on Thursday, January 17, before Judge Cluer, Ellen Arnold, a medicinal tablet hand, sued J. Maud and Co., Ltd., wholesale medicinal tablet manufacturers, for £93 5s. 3d. damages under the Employers' Liability Act, 1880. The plaintiff alleged that she was handed a bottle to be washed, which should have been empty, whereas it contained a corrosive acid, and she was severely burned. It was announced that the parties had come to terms, the defendants agreeing to pay the plaintiff £50 and £10 costs in full and final settlement.

The Reactivities of Solid Carbon in Fuel Processes

A Lecture by Professor J. W. Cobb

A public lecture on "The Reactivities of Solid Carbon in Fuel Processes" was delivered by Professor J. W. Cobb (Livesey Professor of Coal, Gas and Fuel Industries in the University of Leeds) under the auspices of the Institution of Chemical Engineers, in London, on Friday, January 18. Sir Alexander Gibb, President of the Institution of Chemical Engineers, was in the Chair.

THE fundamental reason for the importance of the reactivity of carbon in fuel processes, said Professor Cobb, was that all processes for obtaining the heat of combustion of coal depended upon the gasification of the "fixed carbon" of the coal in combination with oxygen. Direct combustion of the carbon to carbon dioxide, such as took place in boiler furnaces, was rapid, but in other processes, such as the manufacture of producer gas and water gas, the conversion of carbon to carbon monoxide was the result of slower reaction, and the rates of working were dependent upon the reactivities of the carbon employed.

There was a special cause for the intense concentration of interest on the reactivity and general behaviour of carbonised fuels in recent years. The most direct method of abolishing the smoke nuisance and of obtaining useful by-products at the same time was to subject raw coal before use to some process of carbonisation. He was not concerned, in that lecture, with the relative merits and ramifications of the various processes proposed, except to point out that if the solid carbonised fuel was to replace coal successfully in the open domestic grate it must have the good qualities of coal and not merely avoid the bad. If prepared casually, it would not do. They must know more about the fundamental factors responsible for the good and bad qualities, and how they could be controlled in the processes of production.

Factors Determining Reactivity

Professor Cobb then discussed the fundamental factors determining reactivity, and said that since the gasification of a coke necessarily proceeded from the surface, the reactivity could conceivably be expressed as a product of the extent and quality of that surface. Such a factor, in determining reactivity, was important and independent, although the extent of the surface did not lend itself to separate quantitative measurement. The course of carbonisation as regards temperature and other conditions influenced both the extent and the quality of the surface exposed. Rate of passage through the plastic period, decomposition of hydrocarbon gases, and changes in the carbon itself, were all important in determining the results.

Effect of Inorganic Substances

In the course of his remarks, Professor Cobb dealt with the inorganic constituents, and referred to the numerous quantitative observations made during recent years, which had demonstrated clearly that additions of small percentages of some oxides, such as soda, lime and oxide of iron, increased the reactivity of coke both to steam and carbon dioxide in a marked degree. That effect was not due to an increase in the amount of surface. The explanation of the magnitude of the effect was under investigation, but the results obtained, though suggestive, were not ripe for publication.

The application of the results of reactivity determinations to practice was then discussed, and Professor Cobb emphasised the necessity for care in this matter. It is plain that the reactivity, as determined in the laboratory, conveyed useful information, but in practice its significance might be difficult to interpret, or its effect might be obscured. In illustration of this, it was pointed out that in the gas producer the influence of the reactivity of the descending coke column was simple and direct. The CO_2 necessarily generated while air was in excess quite near the grate, had to be reduced as completely as possible to CO if the producer gas was to be of good quality, and here the reactivity of the fuel came into play. A shallower fuel bed or a much higher rate of blowing might become possible if the fuel was more reactive.

Ignitibility

In the domestic open fire the behaviour of solid carbonised fuels had received much attention from Dr. Margaret Fishenden, and had been the subject of special study at Leeds by Mr. Hodsman and collaborators. The influence of reactivity there was somewhat peculiar. In the first place, it was so far complicated by other properties. So much depended upon the rate at which any fresh charge of carbonised fuel could be brought into active combustion throughout the mass or could be brought to a temperature where it could ignite and its reactivity could be made an effective influence. To begin with, the ingitibility came into question—the ease with which combustion could be started at a number of points under such conditions that it would then continue without any further supply of heat from outside.

There was only the roughest possible parallelism between results for ignitibility and reactivity. The reason for this could be readily understood, particularly when one considered semi-carbonised fuels such as the products of low-temperature carbonisation. The structure was not homogeneous, and the ignitibility depended so much upon the number of the more easily ignitible particles scattered through the mass, each acting as an ignition centre. In reactivity, on the other hand, they were concerned with an average property of the whole exposed surface. It would be realised that if the reactivity was determined in CO_2 and steam, the spreading influence of some isolated particles of high reactivity would in any case be checked by the endothermicity of the reaction.

The Water Gas Process

Another rather complicated example was found in the water gas process, with its alternation of blowing with air in order to store heat in the fuel bed and running with steam for the making of water gas. In the air blow the primary object was to store sensible heat in the coke bed by burning some of the carbon. If the coke was reactive, CO_2 was reduced to CO. Less heat, therefore, was stored in the fuel bed, and more went away as producer gas. The unreactive coke was, therefore, better for this stage of the process. When, however, steam was turned on for the "run," making water gas, it was the more reactive coke which was better able to effect its decomposition and so allow of a high rate of working, without the escape of too much undecomposed steam.

In addition to these opposing effects from reactivity, there was a possible complication arising from the peculiar nature of the water gas process, apart altogether from the reactions of gasification. The solid fuel itself functioned like the brick-work of a regenerator, in that it was used as a medium for storing heat during the air "blow," which was given out in the steam "run." The permissible rate of working and length of time during which the air or steam blow should be continued was then partially dependent upon the rate at which the pieces of coke could be heated up or cooled down from the outside, upon passage of heat by conduction, radiation or convection into or out of the porous solid fuel. On that factor there was very little quantitative information.

Apart from these considerations, which were inherent in the nature of the water gas process, others arose in the more modern forms of the plant where a use, more or less efficient, was made of the potential and sensible heat leaving the generator during the air blow for the raising of steam, so lessening the loss arising from the reduction of CO_2 to CO. It was not strange, therefore, that quite different opinions were held and expressed as to whether an unreactive or a reactive coke was, on the whole, better for water gas manufacture. In order to make a fair comparison, it would be necessary to determine by experiment the optimum conditions, and the right cycle for each coke, and to make the comparison on that basis.

Lines of Investigation

It might seem strange to say at this period of the world's history, concluded Professor Cobb, that in the commonest of all chemical reactions in the use of fuel—the gasification of carbon—there was so much left to investigate. It was partly because we knew so little about the fundamental things that, in order to make immediate progress in the preparation of

solid smokeless fuels with desirable properties, so much experimental work of another kind than the purely scientific was called for—work which depended upon large-scale trials, leading to conclusions which could be applied successfully in limited ranges. A similar diversity might be seen in the laboratory tests which were now being applied to coke. On the one hand there was such a determination as that of the reactivity to CO_2 dependent upon a single reaction with a specified temperature and rate of gas flow. On the other hand, various tests had been designed in which the behaviour of a fuel was studied in actual fires and small gas producers, imitating the behaviour of particular appliances or groups of appliances, not testing a single reaction or a single quality, but a group of qualities desirable for certain uses. The diversity arose from the present necessities of the case.

The Common Salt Industry

Processes Described by Mr. Gordon Smith

TAKING for his subject "Common Salt," Mr. C. Gordon Smith, M.Sc., read a paper to the members of the Liverpool Section of the Society of Chemical Industry on Friday, January 18, in the Muspratt Lecture Theatre at the Liverpool University. Dr. Alfred Holt presided.

Sources of Salt

Roughly 2 per cent. of the United Kingdom's average annual output of 2,000,000 tons of salt, Mr. Smith said, is rock salt. This is much less than in pre-war times, and the only salt mine that is now working in Cheshire is the Salt Union's Meadow Bank mine at Winsford. This mine has taken the place of the Adelaide mine at Marston, which was abandoned a year ago, owing to the breaking in of water. The rock salt is obtained by the ordinary method of drilling and shot-firing, and as the bulk of the output is for the export trade for cattle licks, care is taken to keep the material in the largest pieces which can be conveniently handled.

The Board of Trade returns include in their totals of output of salt the salt content of the brine that is pumped to chemical works, and roughly 50 per cent. of the total is thus accounted for. The remaining 48 per cent. is produced from brine in either the open pan or the vacuum evaporator. Common salt was formerly the starting point of many industries, such as in the manufacture of soda ash by the Leblanc process. It has now very largely given place to brine taken from the underground reservoirs occupying the sites of old and abandoned mines, pumped direct to the ammonia-soda works or to electrolytic caustic soda plants.

Processes for Different Grains

Where a coarse-grained salt is required, the brine is evaporated in an "open pan," made of steel or iron plates riveted together, rectangular in shape, and about 2 ft. deep, 25 ft. wide, and from 40 to 80 or even 100 ft. long. It is coal-fired at one end, and the products of combustion pass along brick-work flues upon which the pan rests. By the use of appropriate temperatures, coupled with the addition of various agents, and by the variation in the time it is left in the pan, the salt maker can produce any grain of salt required. In the case of "common" salt, the temperature is maintained at about 95–100° C. and the agent used is a very small quantity of a colloid such as glue. Every second day the salt is withdrawn from the pan, and after a few days' draining it is ready for despatch.

The fish-curers require a coarser and harder salt, containing a small proportion of smaller crystals. The small crystals dissolve rapidly in the fish juices and create a brine which starts the cure, while the larger ones, which at first hold the fish apart, come into solution later. Fishery salt is made by evaporating the brine at about 60–65° C. and adding to it at intervals small quantities of alum, which promotes the development of a particular type of crystal called from its shape a "hopper," which is formed on the surface of the brine and sooner or later falls to the bottom, where it grows. According to the grain required, the salt is drawn after 11–14 days. It is stored in warehouses for about five or six months, in order that it may drain completely and harden thoroughly.

Still coarser salts, such as "bay" salt, are made by maintaining the conditions shown above, but keeping the brine temperature down to 50° C. or lower, with greater intervals between successive drawings.

For making salt "lumps," a very fine grain is required. This is obtained by evaporating the brine at the boiling point and withdrawing the salt every 12 hours or so. As this is drained from the pan, it is put into rectangular wooden tubs, where it drains and cements, to form the block which, in due course, is taken to the drying room, where all remaining moisture is removed.

Salt Union's Weston Point Plant

The Salt Union's triple-effect vacuum plant at Weston Point is the largest in this country. It has pans 28 ft. in diameter, and can make rather more than 30 tons of salt per hour. It derives the heat for the first-effect evaporation from the waste heat of the adjoining power station. The steam from the first effect heats the brine in the second effect, and the steam from that heats the brine in the third effect. The third effect passes its steam into a jet condenser. The vacua maintained in the three pans are, respectively, of the order of 15, 22 and 28 inches, corresponding to boiling points of about 91, 67 and 30° C. respectively. Although the vacuum process has a much greater evaporative efficiency than the open pan process, it suffers from a serious disadvantage, in that no control of grain size of the salt it produces can be exercised. Vacuum salt has a fine grain of very nearly uniform crystal size, as the result of the turbulent conditions under which evaporation takes place. Each crystal is a tiny cube. Salt of the high degree of purity demanded for table use and for the butter and margarine industries is made in the vacuum evaporator from brine which has been previously purified from calcium and magnesium salts by treatment with lime and soda ash. According to the market demand, the pure salt so obtained is packed undried or after it has been passed through a rotary drier, heated by steam tubes. To prevent the caking of table salt, it is dusted with a little light magnesium carbonate.

Recent Research

Examples of recent research carried out in connection with the use of salt include one which was concerned with the problem of the reddening of salted fish and salted hides. In both cases, the reddening was traced to a halophilic organism which develops following the use of solar salt derived from sea-water. The temperature of evaporation in solar processes is not high enough to destroy the abundant organic life present in sea-water. The temperature of evaporation in open pans has been shown to be toxic to such. Hence it can be claimed that freedom from the reddening is ensured by the use of English salts. Another example dealt with the effect of impurities in the salt on its rate of penetration into fish during curing. The presence of calcium and magnesium salts —the latter in particular—definitely reduces the rate. This points to the inadvisability of using ground rock salt or solar salt instead of the purer open-pan fishery salts.

A cordial vote of thanks to Mr. Smith, proposed by the Chairman, was passed. The paper was illustrated by photographic pictures shown on a screen, depicting the interior and working of a rock salt mine; the making of salt by the open-pan system; the making and storing of block salt; the three-effect vacuum plant at the Weston Point works; the shipping of salt by barge and steamer, etc. Specimens of rock, fishery and table salts were displayed on the lecturer's table.

Revival of Non-Ferrous Metallurgy

DR. WILLIAM CULLEN, President-Elect of the Institution of Mining and Metallurgy, speaking at a meeting of the Institution in London, said that the United Kingdom not so many years ago played a much more important role in non-ferrous metallurgy, particularly that of copper, zinc and lead, than it did to-day, and even with the limitations of domestic ores which existed in Great Britain he considered that if the Empire could pull together, this country was in as favourable a position as any other for carrying out non-ferrous metallurgy on the grand scale. He believed that the present time was most opportune because of new metallurgical ideas, stabilised economic conditions, comparatively satisfactory fuel and power, and the proposed derating of industrial hereditaments.

Problem of Dye Fastness

The Demand for Standardisation

DR. S. G. BARKER, of the Wool Research Association's laboratories in Leeds, on Friday, January 18, gave an address to the Manchester Section of the Society of Dyers and Colourists on the standardisation of fastness of dyestuffs on dyed fabrics.

Results from the Fugitometer

A mistake, Dr. Barker contended, was made at the outset in attempting to apply standard tests without first making a close investigation of the various causes of fading, and the chemical and physical actions underlying the phenomenon of fading in actual practice. The Wool Research Association and the Society of Dyers and Colourists, along with every section of the textile industry, had been supervising experimental work to this end. Patterns were sent to fading stations in every country in the world, and were there faded under standard conditions of temperature, humidity, light, and so on; the meteorological conditions being read every hour during the time of exposure. The patterns were then returned to the laboratories in Leeds where an attempt was made to match them by fading under artificial light. By means of an instrument they had devised and named the fugitometer, they were able to control humidity and temperature at the surface of the pattern during the time of exposure. They had found that the results they obtained from the use of this instrument were strictly comparable with those obtained, say, in Bangalore (India), or in California, where the patterns are faded in a pure atmosphere.

There were certain anomalous cases where patterns were faded in a city such as Manchester or Leeds, in which it was found that fading was definitely affected by gases in the atmosphere—such as sulphur dioxide, etc. Unless they could manipulate the atmosphere inside the fugitometer so as to give it the same constitution as the city atmosphere the fading obtained when trying to match patterns could not be exactly the same.

Influence of Humidity

Another piece of work undertaken had been upon the influence of humidity. They had found that a perfectly dry fabric would not fade, but that directly humidity was set up, fading began. They had found there was a definite law in the case of woollen fabrics which governed the "regain" and the amount of fading. That law could be linked up with another law they had discovered with regard to the time of fading, so that if they could get the constants of the equation for any one "regain", and any one time of exposure, they were able to calculate the amount of fading in any other condition of the same dyestuff, provided, of course, the temperature was the same in all cases.

The research work in Leeds had been linked up with that of the medical faculty of the University of Leeds for the purpose of making perspiration tests, and Professor McSwiney was carrying out tests on various persons to find out what was normal and what was abnormal perspiration. This was the first time such work had been done in any country, and it was likely to have far-reaching effects. Once they knew the constitution of perspiration, they would be able to prescribe tests for its effects in relation to the fastness of dyestuffs.

Drug and Chemical Workers' Wages

FOLLOWING upon the recent joint conference in London the Drug and Fine Chemical Manufacturers' Association have intimated to the National Union of Drug and Chemical Workers that existing conditions do not warrant the granting of the wages and conditions claim by the union. If the union insist on referring their claims to arbitration under their national agreement the employers will make a counter-application for reductions in wages and alteration of the adult age. This, it is stated, would represent reductions in wages as high as 16s. a week. The employers state that if the union withdraw its wages claim they will not proceed with their counter-application. The union executive have decided that, in the interests of the members, they see no reason to withdraw the claim, affecting about 20,000 workers, and that it should take its full course in a public arbitration court.

Production of Synthetic Solvents

Important Developments

THE large vinegar factory at Salt End, Hull, which has been erected by the Distillers Co., Ltd., is nearing completion, and vinegar will be produced in very large quantities in the near future. It is understood that the output of this factory for making fermentation vinegar from alcohol will be about one quarter of the total output of the country, and the land has been laid out for three more factories of the same size. This constitutes a new venture in this country for the manufacture of vinegar, but the whole question of large-scale manufacture of this product was thoroughly investigated by the company's experts in America and on the Continent before starting on any plans, so that it is confidently considered that the works in question will embody the very latest knowledge on the subject.

The Distillers Co., Ltd., are closely investigating every possible use for alcohol, as, of course, the high duties on potable spirit, with the resultant effect on consumption, impels them to adopt a most progressive policy.

Acetone, Butyl Alcohol, and Acetic Acid

At Salt End, apart from the vinegar works, operations have been carried on on a site which is in the neighbourhood of 35 acres. It is understood from authoritative sources that these works are part of the property of British Industrial Solvents, Ltd., a new subsidiary of the Distillers Co., which has just been registered, whose object is to produce at Hull very large quantities of solvents for use in the artificial silk, lacquer and other trades. They will be producing very shortly, and the main products to be manufactured at first are acetone, butyl alcohol and acetic acid. The completion of the works is being pushed forward with the utmost dispatch.

The esterification works belonging to the same company are situated outside London, where the very latest plant is installed.

It has been an open secret for some years past that the Distillers Co. have been investigating various methods for making solvents and other products from alcohol, and the present works are the outcome of a good many years of patient research into the question. It is considered that the factory will be the most up-to-date of its kind in the world. Before making any plans for the new factory, investigations were made all over the world into the various methods used. A most modern and comprehensive research department has been installed at Epsom to keep abreast of modern advances.

British Industrial Solvents, Ltd.

In connection with the developments discussed above, attention may be drawn to the notes given in last week's copy of THE CHEMICAL AGE with regard to British Industrial Solvents, Ltd. (under the heading "New Companies Registered"). The company was registered as a "private" company on January 9. The nominal capital is £500,000 in 300,000 8 per cent. cumulative preference (with priority as to capital) and 200,000 ordinary shares of £1 each. The objects are to adopt agreements (1) with the Methylating Co, Ltd., (2) with the Distillers Co., Ltd., and (3) with Holzverkohlungs-Industrie A.-G., and to carry on the business of manufacturers of acetic acid, acetone, butyl alcohol, esters and all other forms of chemicals and chemical products, etc. The directors are W. H. Ross (chairman), Dr. Adalbert Fischer, Dr. Koloman Roka, W. R. Ormandy, H. Green, A. Campbell, T. H. Board.

Further Du Pont Absorption Rumoured

REPORTS are current that the Du Pont company, which recently effected a fusion with the Graselli company, is negotiating with the Mathieson Alkali Works Inc. for a similar purpose. The Mathieson concern, founded in 1892, has a capital of 10 million dollars, and is engaged in the manufacture of heavy chemicals and fertilisers. The works are situated at Saltville, Virginia, at Newark, and at Niagara Falls. The latter works manufactures synthetic nitrogen compounds according to the process of the Nitrogen Engineering Corporation, the capacity being 2,880 tons per annum. In addition, the Mathieson concern has erected an experimental plant for the Great Western Electrochemical Co. The concern took over, in 1917, the Castner Electrolytic Co., and in 1922 the Chemical Corporation of Newark.

From Week to Week

FATAL INDUSTRIAL ACCIDENTS reported during December, 1928, included 6 in chemical, etc., factories.

MR. RUDOLF MUSPRATT, son of Sir Max Muspratt, underwent on Saturday an operation for appendicitis, which, we are glad to hear, was successful.

THE DIRECTORS of the Rio Tinto Co. have appointed Mr. G. W. Gray, late chief of the technical staff, and Mr. J. Gordon McLeod, late secretary of the company, to seats on the board.

DISEASES OF OCCUPATIONS reported in December, 1928, under the Factory and Workshop Act included 5 cases of aniline poisoning and 15 cases of chrome ulceration (8 in the dyeing and finishing trade).

THE CENTENARY of the birth of Kekulé occurs on September 7, 1929. The German Chemical Society will celebrate the occasion by a meeting in Bonn, at which Professor H. Wieland will deliver an address.

THE CABINET, at its meeting on Monday, decided to refer to a committee of Ministers for further examination the request of the Iron and Steel Trades' Confederation for an inquiry into the condition of their trades.

ABOUT 70 FIRMS are enumerated in the preliminary list, just issued, of the exhibitors at the International Oil, Chemical and Colour Trades Exhibition, which will open in about two months' time at the Royal Agricultural Hall, London. A complete list will be issued later.

THE DOMINION BUREAU OF STATISTICS at Ottawa, Canada, reports that, according to finally revised statistics, shipments of sodium carbonate crystals in 1927 from Canada amounted to 805 tons, worth $9,995; in 1926 the total production was 595 tons valued at $5,370.

MR. J. FERGUSON, of 10, Booth Street, Bradford, announces that the firm of Jacob Fuchs V, of Baumbach-Westerwald, have recently appointed him as their sole British representative for their "S.R.F." stoneware filling materials for absorption, washing and distillation towers of all kinds.

THE BOARD OF TRADE is now engaged in preparing a Bill to remove some of the handicaps from the gas industry, as recommended by the National Fuel and Power Committee. The bill will be introduced during the present session, and it is hoped that it will be treated as a non-contentious measure.

AT THE INQUEST, on Tuesday, January 15, at West Ham, on Arthur Leonard Butt, aged 30, a chemist's assistant employed at Woolwich Arsenal, a verdict was returned that death was due to cerebral hæmorrhage, accelerated by coming in contact with some poison allied to nitroglycerine, and that death was due to misadventure.

UNEMPLOYED INSURED PERSONS in the chemical manufacturing industry in Great Britain at December 17, 1928, numbered 6,126; in explosives manufacture, 981; in paint, varnish; japan, red and white lead manufacture, 819; in oil, grease, soap, glue, ink, mutch, etc., manufacture, 4,748. The percentages unemployed were 6·1, 4·9, 4·4 and 6·3 respectively.

PROFESSOR HENRY LOUIS, Professor of Mining at Armstrong College, Newcastle, from 1896 to 1923, and a former President of the Society of Chemical Industry, has been elected President of the Iron and Steel Institute. The autumn meeting of the Institute is to be held in Newcastle, where the Institute last met in 1877 under the presidency of the late Sir William Siemens.

DR. C. H. LANDER, speaking at the Royal Society of Arts on Monday, said that although in Great Britain the use of pulverised fuel was in its infancy, marked progress had taken place during the last few years. In powdered coal installations on a large scale very high efficiencies of steam raising could be maintained. The application of pulverised fuel to marine purposes was exceedingly attractive to a country which had no indigenous supplies of natural oil.

RECENT WILLS INCLUDE:—Mr. Alexander McLaren, of Bell Vale Hall, Bell Vale Road, Liverpool, analytical chemist, managing director of the Bell Vale Orchards Co., Ltd., and formerly technical adviser to the late Sir William P. Hartley, at the Aintree works, who died on October 5, 1928, aged 57, £10,427 (net personalty £8,748).—Mr. John Brookes Chadwick, of Runcorn, for many years manager of the No. 2 division of the Salt Union Works at Weston Point, £3,349.

ARTIFICIAL SILK NEWS.—The Kuhlmann company, the Etablissements Agache Fils, and the Société Dollfus Mieg et Cie. are erecting a large viscose silk factory.—In view of the fact that Courtauld's have decided to build an artificial silk factory in India, the Mitsui company, which controls the Tokio Artificial Silk Co., is planning the erection of a factory in Bombay with German and Italian support.—The world production in 1928 is estimated at 350,000 000 lb., or 30 per cent. more than in 1927. Acetate silk amounted to 0·7 per cent. of the total. Great Britain produced 52,000,000 (compared with 39,000,000 lb. in 1927.)

SIR PHILIP DAWSON has accepted the chairmanship of the Duffield Iron Corporation.

THE MARQUIS OF LINLITHGOW has joined the board of Scottish Agricultural Industries, Ltd.

THE OPERATIVE DYERS in Yorkshire and Lancashire, following an advance in the cost of living index figure, will receive on the first pay day of next month an advance in wages.

TULLY GAS PLANTS (1927), LTD., held its first annual general meeting on Tuesday, in London. A proposal that the company be voluntarily wound up was carried unanimously.

PROFESSOR J. S. HALDANE, F.R.S., and Professor W. A. Bone, F.R.S., gave evidence on Wednesday at the Home Office inquiry into the Holborn explosions, held at the Law Courts.

THE CHEMICAL AND ALLIED TRADES Section of the Manchester Chamber of Commerce has re-elected Messrs. J. Allan and A. Heywood chairman and honorary secretary respectively.

MR. A. STANLEY FOX asks us to announce the change of his address from the Grasseli Powder Co., Cleveland, Ohio, to E.I. du Pont de Nemours and Co., Eastern Laboratory, Gibbstown, New Jersey, U.S..A

MR. P. MARCOTTY, of 94, Gray's Inn Road, Holborn, London, W.C.1, has been appointed sole selling agent for Great Britain of the works Emile Gomez, manufacturers of white leadless paint, zinc white, putty and lithopone.

UNIVERSITY NEWS.—*Oxford*: Mr. C. G. T. Morison, Reader in Agricultural Chemistry, has been awarded a Rhodes Travelling Fellowship. Mr. C. J. Virden, B.A., has been elected to the Lovett Senior Scholarship in Chemistry at New College.

A SUBSTANCE CALLED "CARBOLOY," formed from tungsten carbide and cobalt, is said to have application for glass cutting. It is described as being capable of cutting glass like diamond, and will scratch sapphire, which follows diamond in the scale of hardness.

PROFESSOR H. C. H. CARPENTER, Professor of Metallurgy in the Royal School of Mines, was the recipient this week of the Thomas Turner Gold Medal. The Turner Prize Trust also awarded bronze medals to Mr. A. G. W. Smith, now engaged in post-graduate studies at Birmingham University, and Mr. H. W. Burrows, a student at the Birmingham Central Technical College.

IN CO-OPERATION with the United States Bureau of Mines and the State Mining Experiment Station, the School of Mines and Metallurgy of the University of Missouri is offering four fellowships. These fellowships are open to graduates who have the equivalent of a B.Sc. degree and have had the proper training in mining, metallurgy, or chemistry, and who are qualified to undertake research work. The income of each fellowship is $800 for ten months beginning September 1, 1929. Fellows pay fees amounting to approximately $42 per year.

THE CHEMICAL AND METALLURGICAL CORPORATION, LTD., is providing itself with £350,000 of fresh capital with which to extend its plant at Runcorn, on the Manchester Ship Canal. Formal announcement of the financing will be forthcoming in a few days, together with a progress report. It is understood that the sulphuric acid, the hydrochloric acid, and the platinum plants are already completed and working, and that the lead plant is expected to be in commission next month. Apparently it is the intention to add in some directions to the capacity provided by the original plans. The present financing consists of the sale of 2,000,000 shares at 3s. 6d. net (a premium of 1s. 6d.), and it is understood that considerable cash payments on account have already been made.

THE CANADIAN GOVERNMENT has entered into a contract, which will involve an expenditure of $60,000 (£12,000), with Professor H. T. Barnes, of McGill University, for an experiment on a large scale in cutting ice by burning, using the thermit process. The immediate objective is to obviate the recurrence of the disastrous floods which, last year, as a result of a tremendous ice jam between Montreal and Sorel, caused great damage at the eastern end of Montreal, and delayed the opening of the St. Lawrence to navigation. Professor Barnes has been working on the subject of ice destruction by thermit for some time, and in the course of the last few years has carried out some very interesting experiments on the destruction of icebergs by this means. The thermit process is, of course, well known for welding purposes.

Obituary

MR. RICHARD BAXTER, secretary of the Glenboig Union Fire Clay Co., Ltd., on January 20, at Glasgow.

PROFESSOR ALEXANDER WILLIAM BICKERTON, on Wednesday, aged 87, in London. He was formerly professor of chemistry in the University of New Zealand, but made a great reputation by astronomical work, especially his "cosmic impact" theory of the formation of stars.

DR. HENRY JOHN HORSTMAN FENTON, F.R.S., Honorary Fellow of Christ's College, Cambridge, on January 13, aged 74. Formerly University lecturer in chemistry at Cambridge, he published a considerable number of papers dealing with organic and physical chemistry. He was perhaps best known for his work on oxidation by hydrogen peroxide in the presence of ferrous salts.

References to Current Literature

British

ANALYSIS.—The analysis of mixtures containing acetone, ethyl alcohol and isopropyl alcohol. C. A. Adams and J. R. Nicholls. *Analyst*, January, pp. 2–9.

The Wijs method as the standard for iodine absorption. J. J. A. Wijs. *Analyst*, January, pp. 12–14.

CELLULOSE.—The constitution of nitrated cellulose. F. D. Miles and J. Craik. *Nature*, January 19, p. 82.

Changes in nitrocellulose when exposed to light. V. Cofman and H. B. DeVore. *Nature*, January 19, p. 87.

DYEING.—The behaviour of cellulose acetate towards ammo-derivatives of anthraquinone. H. M. Burns and J. K. Wood. *J. Soc. Dyers and Colourists*, January, pp. 12–15.

GENERAL.—Magnetic properties in relation to chemical constitution. T.M. Lowry and F. L. Gilbert. *Nature*, January 19, p. 85.

The specific gravities and immersion refractometer readings of dilute mixtures of acetone and water. J. R. Nicholls. *Analyst*, January, pp. 9–11.

The natural occurrence of boron compounds in fruits and vegetable products. A. S. Dodd. *Analyst*, January, pp. 15–22.

PETROLEUM.—The bearing of base exchange on the genesis of petroleum. E. McK. Taylor. *J. Institute Petroleum Tech.*, December, pp. 825–840.

United States

AMMONIA, SYNTHETIC.—Synthetic ammonia plant at Ostend. F. A. F. Pallemaerts. *Ind. Eng. Chem.*, January 1, pp. 22–29. The Ostend plant described combines the Union Chimique Belge (or Semet-Solway and Piette) gas treatment process, the Linde hydrogen extraction process, and the Casale ammonia synthesis system.

ANTI-KNOCKS.—Metallic colloids and knock suppression. H. L. Olin and W. J. Jebens. *Ind. Eng. Chem.*, January 1, p. 43.

FERTILISERS.—The fertilising value of many minerals. J. G. Lipman. *American Fertiliser*, January 5, pp. 19–25,55–62.

GENERAL.—A study of the reaction between nitric oxide and hydrogen sulphide. J. H. Pierce. *J. Phys. Chem.*, January, pp. 22–36.

The action of hydrogen sulphide on chromates.—1. H. B. Dunnicliff and C. L. Soni. *J. Phys. Chem.*, January, pp. 81–87.

The behaviour of nitrocellulose gels in polarised light. A. J. Phillips. *J. Phys. Chem.*, January, pp. 118–130. The colours shown by nitrocelluloses of varying nitrogen contents in polarised light are a function of the dispersion of the nitrocellulose.

Pyrex glass as a radium container. S. C. Lind, *Science*, December 28, pp. 643–644.

Boiling points of electrolytic caustic solutions. C. C. Monrad and W. L. Badger. *Ind. Eng. Chem.*, January 1, pp. 40–42.

The detergent action of soap. F. H. Rhodes and S. W. Brainard. *Ind. Eng. Chem.*, January 1, pp. 60–68. A satisfactory method for the quantitative measurement of detergent power is described. The detergent action of various liquids and soaps has been measured. A formula for translating the esperimental data into numerical indices for the detergent characteristics of soaps is given.

Composition and use of ferric hydroxide as a coagulant. E. S. Hopkins. *Ind. Eng. Chem.*, January 1, pp. 58–60. Gives practical operating data governing the use of ferric hydroxide floc as a coagulant and the maximum removal of turbidity by it, as well as a discussion of its theoretical composition.

RESINS, SYNTHETIC.—A light-coloured condensation resin. H. A. Gardner, C. A. Knauss and A. W. van Heuckeroth. *Ind. Eng. Chem.*, January 1, p. 57.

A resin varying in colour from pale to dark amber (according to the duration of heating) is formed on heating together equimolecular proportions of phthalic anhydride and triethylene glycol (the latter being prepared by the elimination of 2 molecules of water from 3 molecules of ethylene glycol).

German

ARTIFICAL SILK.—Distinguishing between different kinds of artificial silk in practice. O. Alden. *Kunstseide*, December 1928, pp. 497–498. Deals with the distinction of viscose and cuprammonium silks.

BOILER WATER.—The production of usable boiler feed water for high and maximum pressure boilers. W. Kärsten. *Chemische Fabrik*, January 16, pp. 27–29.

CEMENT.—Investigations on the hardening of cement.—2. H. Geszner. *Kolloid-Zeitschrift*, January, pp. 65–76.

GENERAL.—The preparation of synthetic bleaching earths. M. Nekritsch. *Zeitschrift anorganische Chem.*, Vol. 177, Part 1, pp. 86–90. By the interaction of aluminium sulphate and sodium silicate there are obtained precipitates of great adsorptive power. These substances contain much crystalline material, do not completely yield their aluminium to acids, purify mineral and plant oils, and adsorb gases. They show variations in their content of aluminium oxide and water, the limits of which agree with those of natural bentonites. These synthetic bleaching earths are regarded as water-containing aluminium silicates of the approximate composition $Al_2O_3.7\ SiO_2.n\ H_2O$.

A method for the simultaneous measurement of plasticity and elasticity. E. C. Bingham and J. W. Robertson. *Kolloid-Zeitschrift*, January, pp. 1–5.

The conveyance of coal dust by pumps. A. Wipprecht. *Chemische Fabrik*, January 16, pp. 25–27.

INORGANIC.—The decomposition of thiosulphate by hydrochloric acid. O. von Deines. *Zeitschrift anorganische Chem.*, Vol. 177, Part 1, pp. 13–16.

Contributions to the knowledge of sulphurous acid and its salts.—6. The decomposition of aqueous bisulphite solutions.—7. The reciprocal action of bisulphite and hydrosulphide. F. Foerster and E. Kircheisen—8. Remarks on the paper by H. Bassett and R. G. Durrant. F. Foerster. *Zeitschrift anorganische Chem.*, Vol. 177, Part 1, pp. 17–41, 42–60, 61–70.

Experiments on the genesis of hydrogen polysulphides. O. von Deines. *Zeitschrift anorganische Chem.*, Vol. 177, Part 1, pp. 124–128. Deals with the production of hydrogen persulphide by the decomposition of sodium thiosulphate and of hydrogen polysulphides by the decomposition of sodium hydrosulphide.

PARTICLE SIZE.—An optical method for the determination of the size of particles in suspensions. G. J. Pokrowski. *Kolloid-Zeitschrift*, January, pp. 55–58.

WATER, DISTILLED.—Advances in the production of distilled water. O. Gerth. *Chemiker-Zeitung*, January 16, pp. 52–53.

Miscellaneous

ANALYSIS.—The determination of cadmium in the metallic state in organic and inorganic compounds. H. ter Meulen and H. J. Ravenswaay. *Recueil Travaux Chimiques Pays-Bas*, January 15, pp. 198–200 (in French). Cadmium is determined accurately by the method of hydrogenation; the metal formed may be volatilised into a receptacle and weighed.

GENERAL.—The industrial distillation of azeotropic mixtures. Absolute alcohol. G. Dubois. *Bulletin Federation Industries Chim. Belgique*, Part 12, 1928, pp. 501–514 (in French).

ORGANIC.—Trichloro- and tetrabromo-nitrobenzaldehydes, hexachloro- and octabromo-indigo. C. van der Bunt. *Recueil Travaux Chimiques pays-Bas*, January 15, pp. 121–146 (in English).

The preparation of 5- and 8-aminoquinolines. R. P. Dikshoorn. *Recueil Travaux Chimiques Pays-Bas*, January 15, pp. 147–154 (in English). The reduction of nitro- to amino-quinolines presents difficulty. The use of stannous chloride leads to the formation of chlorinated derivatives. 75 per cent. yields of the amino-compounds can be obtained by reduction with iron powder in 50 per cent. acetic acid.

Patent Literature

The following information is prepared from published Patent Specifications and from the Illustrated Official Journal (Patents) by permission of the Controller to H.M. Stationery Office. Printed copies of full Patent Specifications accepted may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2, at 1s. each.

Abstracts of Complete Specifications

302,211. CRACKING HYDROCARBON OIL, PROCESS AND APPARATUS FOR. C. Arnold, London. From Standard Development Co., 26, Broadway, New York City, N.Y. U.S.A. Application date, September 12, 1927.

The plant employed is similar to that described in Specification No. 274,763 (see THE CHEMICAL AGE, Vol. XVII, p. 200). The oil to be cracked is first passed into the heated still, and the vapour passes into the fractionating zone, where gasoline and other light fractions are separated. The condensate from the fractionation tower is cracked, and the hot cracked product is injected into the still. Alternatively, residual oil from the still may be cracked and the hot cracked product injected into the fractionation zone. The application to the treatment of crude oil and gas oil is described.

302,212. N-ω-AMINOALKYL AMINONAPHTHALENE CARBOXYLIC ACIDS, MANUFACTURE OF. I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany, and W. Hentrich, Gellertstrasse 1, Wiesdorf/Rhine, Germany. Application date, September 12, 1927. Addition to 230,457.

Specification No. 230,457 (see THE CHEMICAL AGE, Vol. XII, p. 508) describes the production of ω-aminoalkyl-aminonaphthalene sulphonic acids or their derivatives by the reaction of an aliphatic diamine in the presence of a soluble salt of sulphurous acid and a sulphonic acid of a naphthol, or of a naphthylamine, an aminonaphthol, a dioxynaphthalene, or a naphthalene-diamine. In this invention, N-ω-aminoalkyl-aminonaphthalene-carboxylic acids are obtained by the reaction of an alkylene diamine and a soluble sulphite on a hydroxy or amino-naphthalene carboxylic acid. The process is not applicable to the carboxylic acids of hydroxy-naphthalene containing the hydroxy and carboxylic groups in the ortho position to one another, since the carboxylic group is split off by the above treatment. The products are intermediates for the manufacture of dyestuffs, and some examples are given.

302,253. HYDROCARBONS, MANUFACTURE OF. J. Y. Johnson, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, June 9, 1927.

The process is for treating carbonaceous materials which contain substantial amounts of non-aromatic hydrocarbons such as coal, tar, mineral oil, pitch, asphalt, resin, bitumen, or their distillation or conversion products. These are treated with excess of hydrogen above 550° C. and pressure above 20 atmospheres, so that aromatic unsaturated aliphatic or hydro-aromatic hydrocarbons boiling below 200° C. are obtained. The process can be accelerated by the use of catalysts such as aluminium hydroxide, charcoal impregnated with phosphoric acid, magnesia containing 1 per cent. of ruthenium chloride, copper oxide with iron oxide, silver silicate, titanic acid, oxides of beryllium, magnesium or calcium. The raw materials may be in liquid or gaseous condition. The products can be employed as motor fuels, and do not cause knocking in high compression engines.

302,411. ESTERS, PRODUCTION OF. J. Y. Johnson, London. From I.G. Farbeninustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, September 22, 1927.

The esterification of higher fatty acids such as those obtained in the purification of natural oils and fats and polyhydric alcohols is effected in the presence of catalysts consisting of the soaps of aluminium, magnesium, tin, or zinc.

302,415. CONVERSION OF HYDROCARBON OILS INTO LIGHTER OILS. C. Arnold, London. From Standard Development Co., 26, Broadway, New York City, N.Y., U.S.A. Application date, September 22, 1927.

Crude oil is passed under pressure and at high velocity through a heated coil and then to a heat insulated drum maintained at the same temperature and pressure. The temperature in the drum is prevented from rising too high by introducing cool oil at or near the incoming hot oil. In a modification, the coil may be operated at a cracking temperature considerably higher than that in the drum.

302,515. ACETALDEHYDE, PRODUCTION OF. H. S. Hirst, Norton Hall, The Green, Norton-on-Tees, County Durham, and Imperial Chemical Industries, Ltd., Broadway Buildings, Westminster, S.W.1. Application date, January 25, 1928.

Methane is subjected to heat or electric discharges yielding a gas containing 2–10 per cent. of acetylene. This gas is scrubbed in a tower through which dilute sulphuric acid containing mercuric sulphate and ferric sulphate is passed in counter-current. The liquor may then be passed through an electrolytic oxidising plant to maintain the concentration of mercuric salt. The acetaldehyde produced in the process may be removed from the gases by scrubbing them with water, and the gas may then be returned to the electric arc or furnace to increase the content of acetylene. A pressure up to 10 atmospheres may be employed to increase the rate or conversion of the acetylene into acetaldehyde.

302,620. LIQUID AND OTHER HYDROCARBONS AND DERIVATIVES, AND AMMONIA, PRODUCTION OF. J. Y. Johnson, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, September 17, 1927.

In the destructive hydrogenation of coal, tar, mineral oil, or their distillation and conversion products, methane is produced and tends to accumulate when the operations are conducted in a cycle. This may be converted into hydrogen for use again, but nitrogen still tends to accumulate. In this invention, the gaseous hydrocarbons in the waste gases are converted into hydrogen by means of steam, and the hydrogen-nitrogen mixture thus obtained is used for the synthesis of ammonia after the addition of nitrogen or hydrogen to obtain the correct proportions. These gases are particularly suitable since they have low sulphur content. Examples are given.

302,750. ACYL DERIVATIVES OF β-KETONIC ESTERS AND β-DIKETONES, MANUFACTURE OF. Imperial Chemical Industries, Nobel House, Buckingham Gate, London, S.W.1, and S. Coffey, Crumpsall Vale Chemical Works, Blackley, Manchester. Application date, October 6, 1927.

The process is for the manufacture of acyl derivatives of β-ketonic esters or β-diketones, *i.e.*, compounds containing the reactive grouping CO.CH.CO. In the known reaction, a mixture of C- and O-acyl derivatives is obtained and the yield is not good, but it is now found that a good yield of the C-acyl derivative is obtained by the interaction of the alkali metal compounds of these with an organic carboxylic acid anhydride instead of with acid halides. The reaction is represented by the formula

$$\mathrm{Na.CR^{11}(CO.R)(CO.R^1)} + (\mathrm{R^{111}CO})_2\mathrm{O} \rightarrow \mathrm{R^{111}.CO.CR^{11}(COR)(COR^1)} + \mathrm{R^{111}CO_2Na}$$

where R, R^1, R^{11}, R^{111} represent hydrocarbon radicles. The O-acyl derivatives are only formed to the extent of about 20 per cent. according to the equation

$$\mathrm{R^{11}C(CR.ONa)(CO.R^1)} + (\mathrm{R^{111}CO})_2\mathrm{O} \rightarrow \mathrm{R^{11}C(CR.O.COR^{111})(CO.R^1)} + \mathrm{R^{111}CO_2Na}$$

The process is preferably effected in the presence of an inert solvent or a diluent such as petroleum ether, ligroin, benzene, or ether. Examples are given of the preparation of ethyl di-aceto-acetate, ethyl-propionyl aceto-acetate, and ethyl-butyryl aceto-acetic ester.

NOTE.—Abstracts of the following specifications which are now accepted, appeared in THE CHEMICAL AGE when they became open to inspection under the International Convention: 272,555 (E. I. du Pont de Nemours and Co.) relating to catalytic preparation of oxygenated carbon compounds, see Vol. XVII, p. 173; 277,714 (R. B. Goldschmidt and S. Coulier) relating to nitrogenised metallic compounds, see Vol. XVII, p. 467; 286,206 (G. Hugel, M. Paul, and M. Boistel) relating to hydrogenation of organic substances, see Vol. XVIII, p. 417; 295,600 (L. Cassella and Co., Ges.) relating to dyestuffs of the anthanthrone series, see Vol. XIX, p. 369.

International Specifications not yet Accepted

300,630. SODIUM AND POTASSIUM SULPHATES. Chemieverfahren Ges., 15, Wilhelmstrasse, Bochum, Germany. International Convention date, November 18, 1927.

Sodium or potassium chloride is treated with magnesium sulphate in a solution of ammonium chloride in aqueous ammonia. Sodium or potassium sulphate is obtained in solid form.

300,632. ALKALI AND ALKALINE EARTH NITRATES, Kali-Industrie Akt.-Ges., C. T. Thorssell, and A. Kristensson, 139, Hohenzollernstrasse, Kassel, Germany. International Convention date, November 18, 1927.

Alkali or alkaline earth hydroxide or carbonate from the absorption towers of a nitric acid plant is freed from nitrite by treating with nitric acid and steam, and then cooled to 0° C. to deposit the nitrate. The liquor is used again in the towers after adding further hydroxide or carbonate.

300,557. DYES. I. G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. International Convention date, November 14, 1927.

Azo dyes are obtained by coupling diazotized 1-methyl-2-amino-4-isopropylbenzene or a derivative with arylides of 2:3-oxynaphthoic acid or of β-keto-carboxylic acids.

300,919. POTASSIUM AMMONIUM PHOSPHATES. Soc. de Produits Chimiques des Terres Rares, 129, Avenue des Champs Elysées, Paris. International Convention date, November 19, 1927.

Phosphoric acid is treated gradually with potassium chloride, at a temperature rising from 100° to 270° C. The product is cooled, and treated with ammonia to obtain the double salt $NH_4K(H_2PO_4)_2$.

300,922. DYES. F. Bensa, 25, Piazza Fontane Marose, Genoa. (Assignees of A. Zinke, 30, Castellfeldgasse Graz, and W. Pennecke, 25, Lessingstrasse, Graz, Austria.) International Convention date, November 19, 1927.

1 : 12-Perylene-quinone is condensed with benzoyl chloride by means of aluminium chloride at 140—180° C. to obtain a vat dye giving blue shades on cotton, turning green on exposure to air.

300,923. ACETIC ACID. I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. International Convention date. November 19, 1927.

Acetic acid is separated from its aqueous solutions by adding trichlorethylene and rectifying.

300,949. VULCANIZING RUBBER. Goodyear Tire and Rubber Co., 1144, East Market Street, Akron, Ohio, U.S.A. (Assignees of J. Teppema, 29, Mayfield Apartment, Twin Oaks, Akron, Ohio, U.S.A.) International Convention date, November 21, 1927.

A vulcanisation accelerator consists of the reaction product of a mercapto-aryl-thiazole in which one or more of the hydrogen atoms of the aryl ring is replaced by a substituent, and an aryl or aliphatic amine. Some examples are given, together with particulars of the vulcanisation.

300,961. CALCIUM-ALKALI PHOSPHATES. A. Messerschmitt Villa Miramar, Suvigliana-Lugano, Switzerland. International Convention date, November 21, 1927.

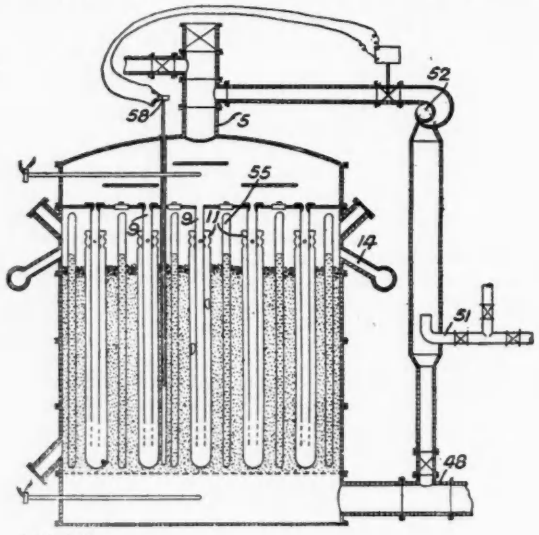
Raw phosphates are sintered with basic or acid substances, such as alkaline earth oxides, alumina, silica, iron oxide, clay or other silicates, an alkali sulphate or crude Stassfurt salts, and a strong reducing agent such as carbon or iron pyrites. The mixture is such that the reaction product contains no free alkali or alkaline earth bases, and the sulphur is completely eliminated.

300,965. CALCIUM PHOSPHATES. J. A. Pond, 214, Remuera Road, Auckland, New Zealand. International Convention date, November 21, 1927.

Ground tri-calcium phosphate is treated with sulphuric acid of sp. gr. 1·36—1·55 in amount 10—20 per cent. less than that necessary for the complete formation of mono-calcium phosphates. The mixture is heated to 280° F. to complete the reaction. A fertiliser is obtained containing a substantial amount of mono-calcium phosphate, some di-calcium phosphates, and relatively little tri-calcium phosphate.

300,968. CATALYTIC OXIDATION OF ORGANIC COMPOUNDS. Selden Co., McCartney, Street, Pittsburg, U.S.A. (Assignees of A. O. Jaeger, 9, North Grandview Avenue, Crafton, Pa., U.S.A.) International Convention date, November 21, 1927.

A mixture of the vapour of an organic compound and an oxidising gas is passed down through tubes 9, up through

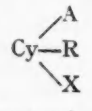


300,968

tubes 11, and down through the catalyst layer. One ingredient may be directly admitted through pipe 14 to the catalyst. Part of the product is withdrawn at 48 and gas is admitted at 51 to correct its composition, the mixture being circulated by the blower 52 back to the inlet 5. The amount is controlled by a thermostat 58 in the catalyst, acting on a valve in the pipe. The temperature of the catalyst may be equalised by solid rods 55, or tubes containing liquid. The apparatus is applicable for oxidising anthracene to anthraquinone; toluol to benzaldehyde and benzoic acid; benzol, phenol, and tar products to maleic acid; acenaphthene or acenaphthylene to acenaphthoquinone, bisacenaphthylidenedione, naphthaldehydic acid, naphthalic anhydride, and hemimellitic acid; fluorene to fluorenone; eugenol and isoeugenol to vanillin and vanillic acid; methyl alcohol and methane to formaldehyde; ethyl alcohol to acetic acid; ethylene chlorhydrin to chloracetic acid.

300,987. DYES. I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. International Convention date, November 22, 1927.

Trisazo and higher polyazo dyes are obtained by coupling any initial diazo component with a 1-naphthylamine derivative containing an O-alkyl or S-alkyl group or a sulphonic or carboxylic acid of such derivative, capable of coupling in *p*-position to the NH_2 group, and the product is diazotised and coupled with a compound of the type



in which Cy represents a cyanuric ring, A represents a substituted or unsubstituted residue of a 1 : 8-aminonaphthol, *e.g.*, a 1 : 8-aminobenzoyl-aminonaphthol or a substitution

product or an equivalent in which —NH.CO— is replaced by —NH.CO.NH—, R represents a residue of an amino-azo compound, and X represents either halogen or a residue united to the ring through N, O, or S. A number of examples are given.

301,022. CALCIUM AND DOUBLE PHOSPHATES. Kali-Chemie Akt.-Ges., 10, Reischstagsufer, Berlin. (Assignees of Rhenania-Kunheim Verein Chemischer Fabriken Akt.-Ges., 10, Reichstagsufer, Berlin.) International Convention date, November 23, 1927.

Crude phosphates are mixed with alkali carbonates or magnesium compounds and silica and calcined in presence of steam in two stages. In the first, the temperature is below fusion until most of the fluorine is expelled, and the temperature is then raised to complete the reaction without fusion. Citrate-soluble phosphates are obtained.

301,087. THYMOL AND MENTHOL. Schering Kahlbaum Akt.-Ges., 170, Müllerstrasse, Berlin. International Conventio ndate, November 24, 1927.

Oxythymol is heated with hydrogen in the presence of a hydrogenation catalyst. Water is split off, and 2 or 8 atomic proportions of hydrogen are taken up. A porous catalyst such as fuller's earth may also be present. Thymol and menthol are obtained.

LATEST NOTIFICATIONS.

304,118. Manufacture of ketonic acid esters. Wacker Ges. für Elektrochemische Industrie Ges., Dr. A. January 14, 1928.

303,853. Viscosimeter. I.G. Farbenindustrie Akt.-Ges. January 11, 1928.

303,890. Process for the refining of wool fat. I.G. Farbenindustrie Akt.-Ges. January 13, 1928.

303,857. Manufacture of alkali bicarbonates. Pennsylvania Salt Manufacturing Co. January 11, 1928.

303,894. Manufacture and production of non-knocking engine fuels of the benzine type. I.G. Farbenindustrie Akt.-Ges. January 13, 1928.

303,808. Manufacture of decomposition products from iron sulphates. I.G. Farbenindustrie Akt.-Ges. January 9, 1928.

303,838. Process for the manufacture of monoazo dyestuffs. I.G. Farbenindustrie Akt.-Ges. January 10, 1928.

303,900. Process and apparatus for the production of chemical compounds. Polanyi, Dr. M., and Bogdandy, Dr. S. von. January 12, 1928.

303,869. Kinematograph apparatus. I.G. Farbenindustrie Akt.-Ges. January 11, 1928.

303,901. Process for the manufacture of hydroxy carboxylic acids of carbazole. I.G. Farbenindustrie Akt.-Ges. January 12, 1928.

304,150. Manufacture of decomposition products of waxes. I.G. Farbenindustrie Akt.-Ges. January 14, 1928.

Specifications Accepted with Date of Application

273,757. Aqueous solutions of organic compounds insoluble in water, Production of. I.G. Farbenindustrie Akt.-Ges. July 2, 1926.

275,995. Condensation products from formaldehyde and thiourea or a mixture of thiourea and urea, Manufacture of. Soc. of Chemical Industry in Basle. August 11, 1926.

276,372. Arylazo-diarylamines, Manufacture of. I.G. Farbenindustrie Akt.-Ges. August 21, 1926.

278,745. Hydrocarbons and substances containing adsorbed hydrocarbons, Manufacture of. General Carbonalpha Co. October 7, 1926.

280,184. Acetone, Production of. Holzverkohlungs Industrie Akt.-Ges. November 4, 1926.

281,621. Steel, Manufacture of. H. Meyer. December 6, 1926.

280,956. Thymol or an isomer thereof and their hydrogenation products, Process for the manufacture of. Schering Kahlbaum Akt.-Ges. November 22, 1926. Addition to 276,010.

294,975. Contact sulphuric acid process. Selden Co. August 3, 1927.

303,424. Black trisazo dyestuff, Manufacture of. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*). September 1, 1927.

303,454. Benzanthrone derivatives, Production of. I. B. Anderson, R. F. Thomson, J. Thomas, and Scottish Dyes, Ltd. June 24, 1927.

303,389. Carboxylic acids of the fatty aromatic series, Manufacture of. A. Carpmael. (*I.G. Farbenindustrie Akt.-Ges.*). July 1, 1927.

303,455. Ammonium phosphates, Production of. J. Y. Johnson (*I.G. Farbenindustrie Akt.-Ges.*). July 4, 1927.

303,459. Sulphuric acid, Manufacture of. S. Robson, B. Lambert and National Processes, Ltd. October 3, 1927.

303,467. Substituted indoles, Process for the manufacture of. A. Carpmael. (*I.G. Farbenindustrie Akt.-Ges.*). October 4, 1927.

303,468. White titanic acid, Manufacture of. A. Carpmael. (*I.G. Farbenindustrie Akt.-Ges.*). October 4, 1927.

303,469. Cyanogen chloride, Manufacture of. A. Carpmael. (*I.G. Farbenindustrie Akt.-Ges.*). October 4, 1927.

303,535. Compounds and their application as vulcanisation accelerators for rubber. Imperial Chemical Industries, Ltd., W. J. S. Naunton, and J. B. Payman. August 31, 1927.

303,538. Dibenzanthrone, Manufacture of. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*). September 6, 1927.

303,684. Copper-silicon alloys. A. L. Mond. (*Metallbank und Metallurgische Ges. Akt.-Ges.*). February 29, 1928.

Applications for Patents

Carpmael, A., and I.G. Farbenindustrie Akt.-Ges. Manufacture of azo dyestuffs. 1,425. January 15.

Carpmael, A., and I.G. Farbenindustrie Akt.-Ges. Manufacture of organic stibinic acids, etc. 1,426. January 15.

Carpmael, A., and I.G. Farbenindustrie Akt.-Ges. Extraction of hydrocarbon from gases. 1,427. January 15.

Carpmael, A., and I.G. Farbenindustrie Akt.-Ges. Manufacture of aromatic amines. 1,844. January 18.

Carpmael, A., and I.G. Farbenindustrie Akt.-Ges. Manufacture of alkali fluorides. 1,845. January 18.

Carpmael, A., and I.G. Farbenindustrie Akt.-Ges. Manufacture of double compounds of organic quaternary salts. 1,846. January 18.

Compagnie de Béthune. Decomposition of ethane into ethylene. 1,407. January 15. (France, March 19, 1928.)

Darby, W. J., Hinchcliffe, H. H., and Major and Co., Ltd. Manufacture of azo dyestuffs. 1,948. January 19.

Du Pont de Nemours and Co., E. I., and Marks, S. G. C. Preparation of organic mercury compounds, etc. 1,933. January 19.

Hinchcliffe, H. H., and Major and Co., Ltd. Sulphonation of aromatic hydroxy derivatives. 1,947. January 19.

Hooley, L. J., Scottish Dyes, Ltd., Thomas J., and Wilson, J. S. Preparation of dyestuffs. 1,602. January 16.

I.G. Farbenindustrie Akt.-Ges., and Johnson, J. Y. Manufacture of carbamates, etc. 1,272. January 14.

I.G. Farbenindustrie Akt.-Ges., and Johnson, J. Y. Production of artificial masses. 1,545. January 15.

I.G. Farbenindustrie Akt.-Ges., and Johnson, J. Y. Production of fertiliser salts. 1,546. January 16.

I.G. Farbenindustrie Akt.-Ges., and Imray, O. Y. Manufacture of anthracene condensation products. 1,687. January 17.

I.G. Farbenindustrie Akt.-Ges., and Johnson, J. Y. Destructive hydrogenation of carbonaceous materials. 1,693. January 17.

I.G. Farbenindustrie Akt.-Ges., and Johnson, J. Y. Apparatus for working up carbonaceous substances. 1,694. January 17.

I.G. Farbenindustrie Akt.-Ges., and Johnson, J. Y. Dehydration of solid substances. 1,695. January 17.

I.G. Farbenindustrie Akt.-Ges., and Johnson, J. Y. Dehydration of salts. 1,696. January 17.

I.G. Farbenindustrie Akt.-Ges., and Johnson, J. Y. Purification of gases. 1,811. January 18.

I.G. Farbenindustrie Akt.-Ges., and Johnson, J. Y. Working-up tars. 1,812. January 18.

I.G. Farbenindustrie Akt.-Ges., and Imray O. Y. Manufacture of azine-dyestuffs. 1,832. January 18.

I.G. Farbenindistrie Akt.-Ges., and Imray, O. Y. Manufacture of aromatic amines. 1,844. January 18.

I.G. Farbenindustrie Akt.-Ges., and Johnson, J. Y. Production of vat dyestuffs. 1,916. January 19.

I.G. Farbenindustrie Akt.-Ges. Manufacture of decomposition products of waxes. 1,323. January 14. (Germany, January 14, 1928.)

I.G. Farbenindustrie Akt.-Ges. Manufacture of artificial rubber. 1,428. January 15. (Germany, January 16, 1928.)

I.G. Farbenindustrie Akt.-Ges. Process for producing drenches for skins. 1,555. January 16. (Germany, January 16, 1928.)

I.G. Farbenindstrie Akt.-Ges. Precipitating baths for making threads, etc., from viscose. 1,691. January 17. (Germany, January 17, 1928.)

I.G. Farbenindustrie Akt.-Ges. Photographic cameras. 1,833. January 18. (Germany, January 18, 1928.)

I.G. Farbenindustrie Akt.-Ges. Process of drenching hides, etc. 1,834. January 18. (Germany, January 18, 1928.)

I.G. Farbenindustrie Akt.-Ges. Manufacture of water-insoluble azo dyestuffs. 1,847. January 18. (Germany, January 20, 1928.)

Imperial Chemical Industries, Ltd. Percussion caps, etc. 1,468. January 15.

Imperial Chemical Industries, Ltd. Method of concentrating caustic alkalis. 1,502. January 16.

Liquid Oxygen Explosives, Ltd., and De Wendel et Cie. Liquid air, etc., explosives. 1,898. January 19.

Soc. of Chemical Industry in Basle. Manufacture of vat dyestuffs. etc. 1,692. January 17. (Switzerland, January 17, 1928),

Weekly Prices of British Chemical Products

The prices and comments given below respecting British chemical products are based on direct information supplied by the British manufacturers concerned. Unless otherwise qualified, the figures quoted apply to fair quantities, net and naked at makers' works.

General Heavy Chemicals

ACID ACETIC, 40% TECH.—£19 per ton.

ACID BORIC, COMMERCIAL.—Crystal, £30 per ton ; powder, £32 per ton ; extra fine powder, £34 per ton.

ACID HYDROCHLORIC.—3s. 9d. to 6s. per carboy d/d, according to purity, strength and locality.

ACID NITRIC, 80° Tw.—£21 10s. to £27 per ton, makers' works, according to district and quality.

ACID SULPHURIC.—Average National prices f.o.r. makers' works, with slight variations up and down owing to local considerations ; 140° Tw., Crude Acid, 60s. per ton. 168° Tw., Arsenical, £5 10s. per ton. 168° Tw., Non-arsenical, £6 15s. per ton.

AMMONIA ALKALI.—£6 15s. per ton f.o.r. Special terms for contracts.

BISULPHITE OF LIME.—£7 10s. per ton, f.o.r. London, packages free.

BLEACHING POWDER.—Spot, £9 10s. per ton d/d ; Contract, £8 10s. per ton d/d, 4-ton lots.

BORAX, COMMERCIAL.—Crystals, £19 10s. to £20 per ton; granulated, £19 per ton ; powder, £21 per ton. (Packed in 2 cwt. bags carriage paid any station in Great Britain.)

CALCIUM CHLORIDE (SOLID).—£5 to £5 5s. per ton d/d carr. paid.

COPPER SULPHATE.—£25 to £25 10s. per ton.

METHYLATED SPIRIT 61 O.P.—Industrial, 1s. 3d. to 1s. 8d. per gall. pyridinised industrial, 1s. 5d. to 1s. 10d. per gall. ; mineralised 2s. 4d. to 2s. 8d. per gall. ; 64 O.P., 1d. extra in all cases.

NICKEL SULPHATE.—£38 per ton d/d.

NICKEL AMMONIA SULPHATE.—£38 per ton d/d.

POTASH CAUSTIC.—£30 to £33 per ton.

POTASSIUM BICHROMATE.—4½d. per lb.

POTASSIUM CHLORATE.—3⅞d. per lb., ex-wharf, London, in cwt. kegs.

SALAMMONIAC.—£45 to £50 per ton d/d. Chloride of ammonia, £37 to £45 per ton, carr. paid.

SALT CAKE.—£3 15s. to £4 per ton d/d. In bulk.

SODA CAUSTIC, SOLID.—Spot lots delivered, £15 2s. 6d. to £18 per ton, according to strength ; 20s. less for contracts.

SODA CRYSTALS.—£5 to £5 5s. per ton, ex railway depots or ports.

SODIUM ACETATE 97/98%.—£21 per ton.

SODIUM BICARBONATE.—£10 10s. per ton, carr. paid.

SODIUM BICHROMATE.—3½d. per lb.

SODIUM BISULPHITE POWDER, 60/62%.—£17 10s. per ton delivered for home market, 1-cwt. drums included ; £15 10s. f.o.r. London.

SODIUM CHLORATE.—2¾d. per lb.

SODIUM NITRITE, 100% BASIS.—£27 per ton d/d.

SODIUM PHOSPHATE.—£14 per ton, f.o.b. London, casks free.

SODIUM SULPHATE (GLAUBER SALTS).—£3 12s. 6d. per ton.

SODIUM SULPHIDE CONC. SOLID, 60/65.—£13 5s. per ton d/d. Contract, £13. Carr. paid.

SODIUM SULPHIDE CRYSTALS.—Spot, £8 12s. 6d. per ton d/d. Contract, £8 10s. Carr. paid.

SODIUM SULPHITE, PEA CRYSTALS.—£14 per ton f.o.b. London, 1-cwt. kegs included.

Coal Tar Products

ACID CARBOLIC CRYSTALS.—6½d. to 6¾d. per lb. Crude 60's, Jan., 1s. 11d. per gall. ; Feb./Mar., 1s. 10½d. per gall.

ACID CRESYLIC 99/100.—2s. 5d. to 3s. per gall. 97/99.—2s. 2d. to 2s. 3d. per gall. Pale, 95%, 1s. 11d. to 2s. per gall. Dark, 1s. 9d. to 1s. 10d.

ANTHRACENE.—A quality, 2d. to 2½d. per unit. 40%, £5 per ton.

ANTHRACENE OIL, STRAINED.—7¾d. to 8d. per gall. Unstrained, 7¼d. to 7½d. per gall.

BENZOLE.—Prices at works : Crude, 10d. to 10½d. per gall. ; Standard Motor, 1s. 4d. to 1s. 4½d. per gall. ; 90%, 1s. 7d. to 1s. 8d. per gall ; Pure, 1s. 10d. to 1s. 11d. per gall.

TOLUOLE.—90%, 1s. 5d. to 1s. 10d. per gall. Firm. Pure, 1s. 10d. to 2s. 2d. per gall.

XYLOL.—1s. 3d. to 1s. 11d. per gall. Pure, 1s. 6d. to 1s. 7d. per gall.

CREOSOTE.—Cresylic, 20/24%, 8¾d. per gall. ; Heavy, 7d. to 7½d. per gall. Middle oil, 5¾d. to 6¼d. per gall. Standard specification, 5½d. to 5¾d. per gall. ex works. Salty, 7½d. per gall.

NAPHTHA.—Crude, 8½d. to 9d. per gall. Solvent, 90/160, 1s. 1½d. to 1s. 2½d. per gall. Solvent, 95/160, 1s. 2d. to 1s. 6d. per gall. Solvent 90/190, 11d. to 1s. 3d. per gall.

NAPHTHALENE, CRUDE.—Drained Creosote Salts, £5 per ton. Whizzed, £5 per ton. Hot pressed, £8 10s. per ton.

NAPHTHALENE.—Crystals, £12 5s. to £14 10s. per ton. Quiet Flaked, £14 to £15 per ton, according to districts.

PITCH.—Medium soft, 35s. to 37s. 6d. per ton, f.o.b., according to district. Nominal.

PYRIDINE.—90/140, 4s. 3d. to 6s. 6d. per gall. 90/180, 2s. 3d. to 3s. per gal. Heavy, 1s. 9d. to 2s. per gall.

Intermediates and Dyes

In the following list of Intermediates delivered prices include packages except where otherwise stated :

ACID AMIDONAPHTHOL DISULPHO (1-8-2-4).—10s. 9d. per lb.

ACID ANTHRANILIC.—6s. per lb. 100%.

ACID BENZOIC.—1s. 8½d. per lb.

ACID GAMMA.—4s. 6d. per lb.

ACID H.—3s. per lb.

ACID NAPHTHIONIC.—1s. 6d. per lb.

ACID NEVILLE AND WINTHER.—4s. 9d. per lb.

ACID SULPHANILIC.—8½d. per lb.

ANILINE OIL.—8d. per lb. naked at works.

ANILINE SALTS.—8d. per lb. naked at works.

BENZALDEHYDE.—2s. 3d. per lb.

BENZIDINE BASE.—3s. 3d. per lb. 100% basis d/d.

BENZOIC ACID.—1s. 8½d. per lb.

o-CRESOL 29/31° C.—5½d. per lb.

m-CRESOL 98/100%.—2s. 3d. to 2s. 6d. per lb.

p-CRESOL 32/34° C.—2s. 3d. to 2s. 6d. per lb.

DICHLORANILINE.—1s. 10d. per lb.

DIMETHYLANILINE.—1s. 11d. per lb.

DINITHROBENZENE.—8d. per lb. naked at works. £75 per ton.

DINITROCHLORBENZENE.—£84 per ton d/d.

DINITROTOLUENE.—48/50° C. 7½d. per lb. naked at works. 66/68° C. 9d. per lb. naked at works.

DIPHENYLAMINE.—2s. 10d. per lb. d/d.

a-NAPHTHOL.—2s. per lb. d/d.

B-NAPHTHOL.—10d. per lb. d/d.

a-NAPHTHYLAMINE.—1s. 3d. per lb.

B-NAPHTHYLAMINE.—3s. per lb.

o-NITRANILINE.—5s. 9d. per lb.

m-NITRANILINE.—3s. per lb. d/d.

p-NITRANILINE.—1s. 8d. per lb.

NITROBENZENE.—6d. per lb. naked at works.

NITRONAPHTHALENE.—1s. 3d. per lb.

R. SALT.—2s. 2d. per lb.

SODIUM NAPHTHIONATE.—1s. 8½d. per lb. 100% basis d/d.

o-TOLUIDINE.—8d. per lb.

p-TOLUIDINE.—1s. 9d. per lb. naked at works.

m-XYLIDINE ACETATE.—2s. 6d. per lb. 100%.

N. W. ACID.—4s. 9d. per lb. 100%.

Wood Distillation Products

ACETATE OF LIME.—Brown, £9 15s. to £10 5s. per ton. Grey, £17 10s. per ton. Liquor, 9d. per gall.

ACETONE.—£75 10s. per ton.

CHARCOAL.—£6 to £8 15s. per ton, according to grade and locality.

IRON LIQUOR.—1s. 3d. per gall. 32° Tw. 1s. per gall. 24° Tw.

RED LIQUOR.—9d. to 10½d. per gall. 16° Tw.

WOOD CRESOTE.—1s. 9d. per gall. Unrefined.

WOOD NAPHTHA, MISCIBLE.—3s. 6d. per gall. Solvent, 4s. to 4s. 1d. per gall.

WOOD TAR.—£3 to £4 per ton.

BROWN SUGAR OF LEAD.—£39 per ton.

Rubber Chemicals

ANTIMONY SULPHIDE.—Golden, 6½d. to 1s. 3d. per lb. according to quality ; Crimson, 1s. 4d. to 1s. 6d. per lb., according to quality.

ARSENIC SULPHIDE, YELLOW.—1s. 9d. per lb.

BARYTES.—£5 10s. to £7 per ton, according to quality.

CADMIUM SULPHIDE.—5s. to 6s. per lb.

CARBON BISULPHIDE.—£25 to £27 10s. per ton, according to quantity

CARBON BLACK.—5½d. per lb., ex wharf.

CARBON TETRACHLORIDE.—£45 to £54 per ton, according to quantity, drums extra.

CHROMIUM OXIDE, GREEN.—1s. 2d. per lb.

DIPHENYLGUANIDINE.—3s. 9d. per lb.

INDIARUBBER SUBSTITUTES, WHITE AND DARK.—4⅝d. to 5⅞d. per lb.

LAMP BLACK.—£32 10s. per ton, barrels free.

LEAD HYPOSULPHITE.—9d. per lb.

LITHOPHONE, 30%.—£23 per ton.

MINERAL RUBBER "RUBPRON."—£13 12s. 6d. per ton, f.o.r. London.

SULPHUR.—£10 to £12 per ton, according to quality.

SULPHUR CHLORIDE.—4d. to 7d. per lb., carboys extra.

SULPHUR PRECIP. B. P.—£55 to £60 per ton.

THIOCARBAMIDE.—2s. 6d. to 2s. 9d. per lb., carriage paid.

THIOCARBANILIDE.—2s. 1d. to 2s. 3d. per lb.

VERMILION, PALE OR DEEP.—6s. 10d. to 7s. per lb.

ZINC SULPHIDE.—8d. to 11d. per lb.

Pharmaceutical and Photographic Chemicals

ACID, ACETIC, PURE, 80%.—£39 per ton ex wharf London in glass containers.

ACID, ACETYL SALICYLIC.—2s. 4½d. to 2s. 5d. per lb.

ACID, BENZOIC, B.P.2s. to 3s. 3d. per lb., according to quantity. Solely ex Gum, 1s. 3d. to 1s. 6d. per oz., according to quantity.

ACID, BORIC B.P.—Crystal, 36s. to 39s. per cwt.; powder, 40s. to 43s. per cwt.; extra fine powder, 42s. per cwt., according to quantity. Carraige paid any station in Great Britain, in ton lots.
ACID, CAMPHORIC.—19s. to 21s. per lb.
ACID, CITRIC.—2s. 2d. to 2s. 3d. per lb.
ACID, GALLIC.—2s. 8d. per lb. for pure crystal, in cwt. lots.
ACID, PYROGALLIC, CRYSTALS.—7s. 3d. per lb. Resublimed, 8s. 3d.
ACID, SALICYLIC, B.P. PULV.—1s. 4½d. to 1s. 6d. per lb. Technical.—10½d. to 11½d. per lb.
ACID, TANNIC B.P.—2s. 8d. to 2s. 10d. per lb.
ACID, TARTARIC.—1s. 4½d. per lb., less 5%.
ACETANILIDE.—1s. 5d. to 1s. 8d. per lb. for quantities.
AMIDOL.—7s. 6d. to 9s. per lb., d/d.
AMIDOPYRIN.—7s. 9d. to 8s. per lb.
AMMONIUM BENZOATE.—3s. 3d. to 3s. 6d. per lb., according to quantity. 18s. per lb. ex Gum.
AMMONIUM CARBONATE B.P.—£37 per ton. Powder, £39 per ton in 5 cwt. casks. Resublimated, 1s. per lb.
ATROPHINE SULPHATE.—9s. per oz.
BARBITONE.—5s. 9d. to 6s. per lb.
BENZONAPHTHOL.—3s. to 3s. 3d. per lb. spot.
BISMUTH CARBONATE.—9s. 9d. per lb.
BISMUTH CITRATE.—9s. 3d. per lb.
BISMUTH SALICYLATE.—8s. 9d. per lb.
BISMUTH SUBNITRATE.—8s. 3d. per lb.
BISMUTH NITRATE.—Cryst. 5s. 9d. per lb.
BISMUTH OXIDE.—12s. 3d. per lb.
BISMUTH SUBCHLORIDE.—10s. 9d. per lb.
BISMUTH SUBGALLATE.—7s. 9d. per lb. Extra and reduced prices for smaller and larger quantities of all bismuth salts respectively.
BISMUTHI ET AMMON LIQUOR.—Cit. B.P. in W. Qts. 1s. 0½d. per lb.; 12 W. Qts. 11½d. per lb.; 36 W Qts. 11d. per lb.
BORAX B.P.—Crystal, 24s. to 27s. per cwt.; powder, 25s. to 28s. per cwt., according to quantity. Carriage paid any station in Great Britain, in ton lots.
BROMIDES.—Ammonium, 2s. to 2s. 3d. per lb.; potassium, 1s. 8½d. to 1s. 11½d. per lb.; sodium, 1s. 11d. to 2s. 2d. per lb.; granulated, ½d. per lb. less; all spot. Large quantities at lower rates.
CALCIUM LACTATE.—B.P., 1s. 2½d. to 1s. 3½d. per lb.
CAMPHOR.—Refined flowers, 2s. 11d. to 3s. per lb., according to quantity; also special contract prices.
CHLORAL HYDRATE.—3s. 2d. to 3s. 4d. per lb.
CHLOROFORM.—2s. 5½d. to 2s. 7½d. per lb., according to quantity.
CREOSOTE CARBONATE.—6s. per lb.
ETHERS.—S.G. ·730—11d. to 1s. per lb., according to quantity other gravities at proportionate prices.
FORMALDEHYDE, 40%.—37s. per cwt., in barrels, ex wharf.
GUAIACOL CARBONATE.—4s. 6d. to 4s. 9d. per lb.
HEXAMINE.—1s. 11d. to 2s. 2d. per lb.
HOMATROPINE HYDROBROMIDE.—30s. per oz.
HYDRASTINE HYDROCHLORIDE.—English make offered at 120s. per oz.
HYDROGEN PEROXIDE (12 VOLS.).—1s. 4d. per gallon, f.o.r. makers' works, naked. Winchesters, 2s. 11d. per gall. B.P., 10 vols., 2s. to 2s. 3d. per gall.; 20 vols., 4s. per gall.
HYDROQUINONE.—3s. 9d. to 4s. per lb., in cwt. lots.
HYPOPHOSPHITES.—Calcium, 2s. 9d. per lb.; potassium, 3s. per lb.; sodium, 2s. 11d. per lb., in 1 cwt. lots, assorted.
IRON AMMONIUM CITRATE.—B.P., 2s. 8d. to 2s. 11d. per lb. Green, 3s. 1d. to 3s. 4d. per lb.; U.S.P., 2s. 9d. to 3s. per lb.
IRON PERCHLORIDE.—18s. to 20s. per cwt., according to quantity.
IRON QUININE CITRATE.—B.P., 8¾d. to 9¼d. per oz., according to quantity.
MAGNESIUM CARBONATE.—Light commercial, £31 per ton net.
MAGNESIUM OXIDE.—Light commercial, £62 10s. per ton, less 2½%; Heavy commercial, £21 per ton, less 2½%; in quantity lower; Heavy Pure, 2s. to 2s. 3d. per lb.
MENTHOL.—A.B.R. recrystallised B.P., 22s. 3d. per lb. net; Synthetic, 10s. to 11s. per lb.; Synthetic detached crystals, 11s. to 16s. per lb., according to quantity; Liquid (95%), 9s. 6d. per lb.
MERCURIALS B.P.—Up to 1 cwt. lots, Red Oxide, crystals, 8s. 4d. to 8s. 5d. per lb., levig., 7s. 10d. to 7s. 11d. per lb.; Corrosive Sublimate, Lump, 6s. 7d. to 6s. 8d. per lb., Powder, 6s. to 6s. 1d. per lb.; White Precipitate, Lump, 6s. 9d. to 6s. 10d. per lb., Powder, 6s. 10d. to 6s. 11d. per lb., Extra Fine, 6s. 11d. to 7s. per lb.; Calomel, 7s. 2d. to 7s. 3d. per lb.; Yellow Oxide, 7s. 8d. to 7s. 9d. per lb.; Persulph, B.P.C., 6s. 11d. to 7s. per lb.; Sulph. nig., 6s. 8d. to 6s. 9d. per lb. Special prices for larger quantities.
METHYL SALICYLATE.—1s. 3d. to 1s. 6d. per lb.
METHYL SULPHONAL.—8s. 9d. to 9s. per lb.
METOL.—9s. to 11s. 6d. per lb. British make.
PARAFORMALDEHYDE.—1s. 9d. per lb. for 100% powder.
PARALDEHYDE.—1s. 4d. per lb.
PHENACETIN.—2s. 5d. to 2s. 8d. per lb.
PHENAZONE.—3s. 9d. to 4s. per lb.
PHENOLPHTHALEIN.—6s. to 6s. 3d. per lb.
POTASSIUM BITARTRATE 99/100% (Cream of Tartar).—96s. per cwt., less 2½ per cent.
POTASSIUM CITRATE.—B.P.C., 2s. 6d. to 2s. 9d. per lb.
POTASSIUM FERRICYANIDE.—1s. 9d. per lb., in cwt. lots.
POTASSIUM IODIDE.—16s. 8d. to 17s. 2d. per lb., according to quantity.
POTASSIUM METABISULPHITE.—6d. per lb., 1-cwt. kegs included f.o.r. London.
POTASSIUM PERMANGANATE.—B.P. crystals, 5½d. per lb., spot.
QUININE SULPHATE.—1s. 8d. to 1s. 9d. per oz., bulk in 100 oz. tins.
RESORCIN.—2s. 10d. to 3s. per lb., spot.
SACCHARIN.—47s. per lb.; in quantity lower.
SALOL.—2s. 3d. to 2s. 6d. per lb.
SODIUM BENZOATE, B.P.—1s. 8d. to 1s. 11d. per lb.
SODIUM CITRATE, B.P.C., 1911.—2s. 3d. to 2s. 6d. per lb., B.P.C. 1923—2s. 8d. to 2s. 9d. per lb. U.S.P., 2s. 6d. to 2s. 9d. per lb., according to quantity.
SODIUM FERROCYANIDE.—4d. per lb., carriage paid.
SODIUM HYPOSULPHITE, PHOTOGRAPHIC.—£15 per ton, d/d consignee's station in 1-cwt. kegs.
SODIUM NITROPRUSSIDE.—16s. per lb.
SODIUM POTASSIUM TARTRATE (ROCHELLE SALT).—95s. to 100s. per cwt. Crystals, 5s. per cwt. extra.
SODIUM SALICYLATE.—Powder, 1s. 6½d. to 1s. 7d. per lb. Crystal, 1s. 7d. to 1s. 8d. per lb.
SODIUM SULPHIDE, PURE RECRYSTALLISED.—10s. to 1s. 1d. per lb.
SODIUM SULPHITE, ANHYDROUS.—£27 10s. to £28 10s. per ton, according to quantity. Delivered U.K.
SULPHONAL.—6s. 6d. to 6s. 9d. per lb.
TARTAR EMETIC, B.P.—Crystal or powder, 2s. 1d. to 2s. 3d. per lb.
THYMOL.—Puriss., 9s. 6d. to 9s. 9d. per lb., according to quantity. Firmer. Natural, 12s. 6d. per lb.

Perfumery Chemicals

ACETOPHENONE.—6s. 6d. per lb.
AUBEPINE (EX ANETHOL).—11s. per lb.
AMYL ACETATE.—2s. 6d. per lb.
AMYL BUTYRATE.—4s. 6d. per lb.
AMYL SALICYLATE.—2s. 9d. per lb.
ANETHOL (M.P. 21/22° C.).—5s. 3d. per lb.
BENZYL ACETATE FROM CHLORINE-FREE BENZYL ALCOHOL.—1s. 10d. per lb.
BENZYL ALCOHOL FREE FROM CHLORINE.—1s. 10d. per lb.
BENZALDEHYDE FREE FROM CHLORINE.—2s. 6d. per lb.
BENZYL BENZOATE.—2s. 3d. per lb.
CINNAMIC ALDEHYDE NATURAL.—15s. 6d. per lb.
COUMARIN.—8s. 6d. per lb.
CITRONELLOL.—10s. per lb.
CITRAL.—8s. 3d. per lb.
ETHYL CINNAMATE.—6s. per lb.
ETHYL PHTHALATE.—2s. 9d. per lb.
EUGENOL.—12s. per lb.
GERANIOL (PALMAROSA).—20s. per lb.
GERANIOL.—6s. 6d. to 10s. per lb.
HELIOTROPINE.—4s. 9d. per lb.
ISO EUGENOL.—16s. per lb.
LINALOL.—Ex Bois de Rose, 13s. per lb. Ex Shui Oil, 9s. 3d. per lb.
LINALYL ACETATE.—Ex Bois de Rose, 17s. 6d. per lb. Ex Shui Oil Linalol. 10s. 6d. per lb.
METHYL ANTHRANILATE.—8s. per lb.
METHYL BENZOATE.—4s. per lb.
MUSK KETONE.—34s. per lb.
MUSK XYLOL.—7s. per lb.
NEROLIN.—3s. 9d. per lb.
PHENYL ETHYL ACETATE.—11s. per lb.
PHENYL ETHYL ALCOHOL.—10s. per lb.
RHODINOL.—45s. per lb.
SAFROL.—1s. 8d. per lb.
TERPINEOL.—1s. 6d. per lb.
VANILLIN.—16s. 6d. per lb.

Essential Oils

ALMOND OIL.—Foreign S.P.A., 10s. 6d. per lb.
ANISE OIL.—2s. 9d. per lb.
BERGAMOT OIL.—23s. per lb.
BOURBON GERANIUM OIL.—21s. per lb.
CAMPHOR OIL.—9d. per lb.
CANANGA OIL, JAVA.—12s. per lb.
CINNAMON OIL LEAF.—7s. per oz.
CASSIA OIL, 80/85%.—6s. 9d. per lb.
CITRONELLA OIL.—Java, 2s. 1d. per lb., c.i.f. U.K. port. Ceylon, pure, 1s. 10½d. per lb.
CLOVE OIL (90/92%).—10s. 6d. per lb.
EUCALYPTUS OIL, AUSTRALIAN, B.P. 70/75%.—2s. per lb.
LAVENDER OIL.—Mont Blanc, 48/50%, Esters, 16s. 9d. per lb.
LEMON OIL.—14s. 9d. per lb.
LEMONGRASS OIL.—4s. per lb.
ORANGE OIL, SWEET.—21s. per lb.
OTTO OF ROSE OIL.—Anatolian, 35s. per oz. Bulgarian, 75s. per oz.
PALMA ROSA OIL.—13s. per lb.
PEPPERMINT OIL.—Wayne County, 15s. 6d. per lb.; Japanese, 8s. per lb.
PETITGRAIN.—8s. 6d. per lb.
SANDALWOOD.—Mysore, 28s. per lb., 95% 18s. 9d. per lb.

London Chemical Market

The following notes on the London Chemical Market are specially supplied to THE CHEMICAL AGE *by Messrs. R. W. Greeff & Co., Ltd., and Messrs. Chas. Page & Co., Ltd., and may be accepted as representing these firms' independent and impartial opinions.*

London, January 24, 1929.

BUSINESS this week has been quite good, with very little change in prices. The improvement in the export business has also continued.

General Chemicals

ACETIC ACID is unchanged at £36 10s. to £37 10s. per ton for 80%.
ACETONE is firm at £77 to £85 per ton, supplies still short, and in good demand.
ACID CITRIC is quiet and unchanged at 2s. 2d. to 2s. 4d. per lb., less 5%.
ACID LACTIC is unchanged at £43 per ton for pale technical quality 50% weight.
ARSENIC is unchanged at £16 per ton, f.o.r. mines.
AMMONIUM CHLORIDE.—The position is firm with an upward tendency.
BARIUM CHLORIDE.—The position is unchanged with a very good demand, but supplies short, especially for early delivery. Price about £11 to £11 10s. per ton for spot prices.
CREAM OF TARTAR is unchanged at £95 to £97 10s. per ton for 99/100% B.P.
COPPER SULPHATE is very firm at about £28 per ton and in short supply, especially for early delivery.
FORMALDEHYDE is very firm at £39 per ton and in very good demand.
FORMIC ACID is in steady demand at £43 per ton for 85%.
LEAD ACETATE is unchanged at £42 10s. per ton for white and £41 10s. per ton for brown.
LEAD NITRATE is in steady demand at £36 per ton, delivered U.K.
LIME ACETATE is unchanged.
LITHOPONE is unchanged at £19 15s. to £21 per ton and in good demand.
METHYL ACETONE is very firm at £58 to £60 per ton and in good demand.
METHYL ALCOHOL.—The position is very firm and with advancing prices.
NITRITE OF SODA is unchanged at £20 per ton with quite a brisk demand.
OXALIC ACID is firm at £30 10s. to £32 10s. per ton and in good demand.
PERMANGANATE OF POTASH continues firm at 5½d. per lb., for needle crystals, B.P.
POTASSIUM CARBONATE AND CAUSTIC.—Unchanged.
POTASSIUM CHLORATE at £28 to £30 per ton.
POTASSIUM PRUSSIATE.—Price continues firm at £63 10s. to £65 10s. per ton, according to quantity.
PRUSSIATE OF SODA is firm at 4½d. to 5½d. per lb.
SODIUM ACETATE is in good demand and firm at £21 to £22 per ton.
SODIUM BICHROMATE.—At 3½d. per lb., with rebates for contracts, and in good demand.
SODIUM CHLORATE is firm at £25 per ton with an increasing demand.
SODIUM PHOSPHATE is unchanged at about £12 per ton for di-basic and £17 10s. per ton for tri-basic.
SODIUM HYPOSULPHIDE is unchanged.
SULPHATE OF ALUMINA continues in active demand and is very firm at £6 15s. to £7 per ton with supplies short.
SULPHIDE OF SODIUM is unchanged.
TARTAR EMETIC at 10½d. per lb. to 11d. per lb., according to quantity, with a good export enquiry.
TARTARIC ACID.—A little more business has been done during the current week at 1s. 4½d. to 1s. 4⅝d. per lb., less 5%.
ZINC SULPHATE is unchanged at about £12 per ton.

Coal Tar Products

The slightly better tone noted in the coal tar products market last week is maintained, although there is little change in prices to report.

MOTOR BENZOL is still scarce, the price being about 1s. 7½d. to 1s. 8d. per gallon, f.o.r. makers' works.
SOLVENT NAPHTHA is unchanged, at 1s. 1½d. per gallon, f.o.r.
HEAVY NAPHTHA remains at 1s. 1d. to 1s. 1½d. per gallon, on rails.
CREOSOTE OIL is unchanged, at 5¼d. per gallon in the North and at 6d. per gallon in London.
CRESYLIC ACID is weak, the 98/100% quality being obtainable at about 1s. 10d. per gallon, and the dark quality 95/97% at 1s. 8d. per gallon, f.o.b.
NAPHTHALENES are unchanged, the firelighter quality being quoted at about £4 10s. per ton, the 74/76 quality at £5 per ton, and the 76/78 quality at £6 to £6 5s. per ton.
PITCH is unchanged, at 35s. to 37s. per ton, f.o.b.

Nitrogen Products

Sulphate of Ammonia.—The market continues to be active, and satisfactory reports are still coming in. There is no change in prices to report. The business is being done at the quoted price of £10 per ton, f.o.b. U.K. port in single bags for January shipment, and £10 2s. per ton for February shipment and onwards. In the home market some further orders have been placed, and the country merchants are now taking stuff into store in anticipation of the spring demand.

Nitrate of Soda is unchanged.

Latest Oil Prices

LONDON, JANUARY 23.—LINSEED OIL steady but quiet. Spot ex mill, £29 5s.; February–April, £28 5s.; May–August, £28 10s.; and September–December, £29, naked. RAPE OIL was steady. Crude extracted, £42; technical refined, £44, naked, ex wharf. COTTON OIL was quiet. Egyptian crude, £30; refined common edible, £35 10s.; and deodorised, £37 10s. per ton, naked, ex mill. TURPENTINE was dull and 6d. to 9d. per cwt. lower. American spot, 48s.; February–April, 48s. 6d.

HULL, JANUARY 23.—LINSEED OIL.—Spot to April, £28 5s.; May–August, £28 10s.; September–December, £28 15s. per ton, naked. COTTON OIL.—Egyptian crude, new and January–February, £28 10s.; edible refined and January–February, £32; technical, £32; deodorised, £34 per ton, naked. PALM KERNEL OIL.—Crude naked, 5½ per cent., £36 15s. per ton. GROUND NUT OIL.—Crushed-extracted, £38; deodorised, £42 per ton. SOYA OIL.—Crude-extracted, £32; deodorised, £35 10s. per ton. RAPE OIL.—Crude-extracted, £41 5s.; refined, £43 5s. per ton. TURPENTINE.—Spot, 50s. 9d. per cwt., net cash terms, ex mill. CASTOR OIL and COD OIL unaltered.

South Wales By-Products

SOUTH WALES by-product activities are unchanged, the demand generally being very moderate and values easy. Pitch calls continue to be unsatisfactory and prices are nominal round the 37s. per ton mark. Refined tars have a steady, but quieter, demand. Coke oven tar is quoted at 7d. to 7¼d. per gallon delivered, and gasworks tar at 6¼d. to 7d. per gallon delivered. Crude naphthalene has scarcely any call round about 80s. per ton, and a similar remark applies to whizzed round about 100s. per ton. Road tar is in slightly better demand at the lower value of from 12s. to 15s. per 40 gallons. Patent fuel and coke exports continue to show a stronger tendency. Prices are unchanged, patent fuel being quoted at 20s. to 21s. per ton, ex ship Cardiff, and from 19s. 6d. to 19s. 9d. ex ship Swansea. Coke, best foundry, is 32s. 6d. to 37s. per ton; furnace, from 19s. to 21s. per ton.

Chemical and Colour Merchant's Affairs

A SITTING for the public examination of Frank Smith, colour merchant, of 10, Philpot Lane, London, was appointed in the London Bankruptcy Court on Tuesday, before Mr. Registrar Mellor. He had carried on business as a chemical and colour merchant, and the proceedings in his case had been consolidated by order of court with those *in re* Robert Alexander Larcombe, described as of 3, Haydon Street, Minories, London, colour and chemical mrechant, against whom a receiving order has also been made. The consolidation order is dated January 1. The debtor Smith has filed a statement of affairs in which he returns ranking liabilities at £2,123, and values his net assets at £1,937, of which £1,422 is represented by the amount claimed as due from a partnership. Mr. Vincent Armstrong, Assistant Official Receiver, informed the court that there had been two receiving orders, one against the debtor Smith on December 6, and one against the debtor Larcombe, which was in the division of another of the official receivers. They had, however, recently been consolidated. Smith had filed a statement of affairs, but none had been lodged by Larcombe, and he understood that they refused to file a joint statement of affairs, preferring to lodge separate documents. In these circumstances he asked for an adjournment of their public examination until March 12th, and for an order on Larcombe also to file a statement of affairs within seven days. This application his Honour granted.

Scottish Chemical Market

The following notes on the Scottish Chemical Market are specially supplied to THE CHEMICAL AGE *by Messrs. Charles Tennant and Co., Ltd., Glasgow, and may be accepted as representing the firm's independent and impartial opinions.*

Glasgow, January 23, 1929.

THE heavy chemical market continues to be fairly active, and there is more movement at this period than at the corresponding time last year, particularly as regards export inquiries. Prices since the slight changes in alkali chemicals at the beginning of the year show little or no change.

Industrial Chemicals

ACETONE, B.G.S.—£77 10s. to £85 per ton, ex wharf according to quantity. There is still little available for immediate delivery.

ACID ACETIC, 98/100%.—Glacial, £56 to £67 per ton, according to quality and packing, c.i.f. U.K. ports; 80% pure, £37 10s. per ton, ex wharf; 80% technical, £37 10s. per ton, ex wharf.

ACID BORIC.—Crystals, granulated or small flakes, £30 per ton. Powder, £32 per ton, packed in bags, carriage paid U.K. stations.

ACID CARBOLIC, ICE CRYSTALS.—Quoted 6⅜d. per lb., delivered or f.o.b. U.K. ports.

ACID CITRIC, B.P. CRYSTALS.—Now quoted 2s. 3d. per lb., less 5%, ex wharf.

ACID HYDROCHLORIC.—Usual steady demand. Arsenical quality, 4s. per carboy. Dearsenicated quality, 5s. 6d. per carboy, ex works, full wagon loads.

ACID NITRIC.—80° quality, £24 10s. per ton, ex station, full truck loads.

ACID OXALIC, 98/100%.—On offer from the Continent at 3¼d. per lb., ex wharf. Spot material quoted 3½d. per lb., ex store. In better demand.

ACID SULPHURIC.—£2 15s. per ton, ex works, for 144° quality, £5 15s. per ton for 168° quality. Dearsenicated quality 20s. per ton extra.

ACID TARTARIC, B.P. CRYSTALS.—Quoted 1s. 4½d. per lb., less 5%, ex wharf. Offered for prompt shipment at 1s. 4d. per lb., less 5%, ex wharf.

ALUMINA SULPHATE.—On offer at £5 10s. per ton, c.i.f. U.K. ports. Spot material quoted £5 15s. per ton, ex store.

ALUM, LUMP POTASH.—Quoted £8 7s. 6d. per ton, c.i.f. U.K. ports, prompt shipment from the Continent. Crystal meal quoted £8 10s. per ton, ex store.

AMMONIA, ANHYDROUS.—Quoted 9½d. per lb., carriage paid. Containers extra and returnable.

AMMONIA CARBONATE.—Lump quality quoted £36 per ton; powdered, £38 per ton, packed in 5 cwt. casks delivered U.K. stations or f.o.b. U.K. ports.

AMMONIA LIQUID, 80°.—Unchanged at about 2½d. to 3d. per lb., delivered according to quantity.

AMMONIA MURIATE.—Grey galvanisers' crystals of British manufacture quoted £21 to £22 per ton, ex station. Fine white crystals offered from the Continent at about £17 5s. per ton, c.i.f. U.K.

ANTIMONY OXIDE.—Offered for spot delivery at £36 15s. per ton, ex wharf.

ARSENIC, WHITE POWDERED.—Quoted £18 10s. per ton, ex wharf, prompt dispatch from mines. Spot material on offer at £19 15s. per ton, ex store.

BARIUM CHLORIDE.—Rather firm and now quoted at £10 2s. 6d. per ton, c.i.f. U.K. ports, prompt shipment from the Continent.

BLEACHING POWDER.—British manufacturers' contract price to consumers unchanged at £6 12s. 6d. per ton delivered in minimum 4 ton lots. Continental now offered at about the same figure.

CALCIUM CHLORIDE.—Remains unchanged. British manufacturers' price, £4 5s. to £4 15s. per ton, according to quality and point of delivery. Continental material on offer at £3 12s. 6d. per ton, c.i.f. U.K. ports.

COPPERAS, GREEN.—Unchanged at about £3 10s. per ton, f.o.r. works or £4 12s. 6d. per ton, f.o.b. U.K. ports.

COPPER SULPHATE.—Market shows a slackening tendency and supplies now on offer at £25 15s. per ton, ex wharf.

FORMALDEHYDE, 40%.—Some spot material available at about £37 10s. per ton, ex quay.

GLAUBER SALTS.—English material unchanged at £5 per ton, ex store or station. Continental quoted £2 15s. per ton, c.i.f. U.K. ports.

LEAD, RED.—On offer at £29 10s. per ton, ex store.

LEAD, WHITE.—Quoted £37 10s. per ton, c.i.f. U.K. ports.

LEAD ACETATE.—White crystals quoted £41 per ton, ex store. Brown on offer at about £31 10s. per ton, ex store.

MAGNESITE, GROUND CALCINED.—Quoted £8 10s. per ton, ex store. In moderate demand.

METHYLATED SPIRIT.—Industrial quality 64 O.P. quoted 1s. 4d. per gallon, less 2½%, delivered.

POTASSIUM BICHROMATE.—Quoted 4¼d. per lb. delivered U.K. or c.i.f. Irish ports with an allowance of 2½% for minimum 2½ tons to be taken during six months.

POTASSIUM CARBONATE 96/98%.—Offered from the Continent at £25 per ton c.i.f. U.K. ports. Spot material available at £36 per ton ex store.

POTASSIUM CHLORATE.—99¾/100% powder. Quoted £22 15s. per ton c.i.f. U.K. ports.

POTASSIUM NITRATE.—Refined granulated quality quoted £19 2s. 6d. per ton c.i.f. U.K. ports. Spot material on offer at about £20 10s. per ton, ex store.

POTASSIUM PERMANGANATE B.P. CRYSTALS.—Quoted 5¼d. per lb., ex wharf.

POTASSIUM PRUSSIATE (YELLOW).—Offered for prompt shipment from the Continent at 6¾d. per lb., ex wharf. Spot material quoted 7d. per lb., ex store.

SODA CAUSTIC.—Powdered 98/99% now £17 10s. per ton in drums, £18 15s. per ton in casks. Solid, 76/77%, £14 10s. per ton in drums; 70/72%, £14 2s. 6d. per ton in drums, all carriage paid buyer's station, minimum 4 ton lots, for contract 10s. per ton less.

SODIUM ACETATE.—On offer for prompt delivery at about £21 5s. per ton, ex store.

SODIUM BICARBONATE.—No change in price for this year. Refined recrystallised, £10 10s. per ton, ex quay or station. M.W. quality, 30s. per ton less.

SODIUM BICHROMATE.—Price during first six months of this year, 3¼d. per lb. delivered U.K. or c.i.f. Irish ports, less 2½% for contract of minimum 2½ tons.

SODIUM CARBONATE (SODA CRYSTALS).—£5 to £5 5s. per ton, ex quay or station. Powdered or pea quality, 27s. 6d. per ton. Extra light soda ash, £7 1s. 3d. per ton, ex quay, minimum 4 ton lots, with various reductions for contracts.

SODIUM HYPOSULPHITE.—Large crystals of English manufacture quoted £8 17s. 6d. per ton, ex station, minimum 4 ton lots. Pea crystals on offer at £14 15s. per ton, ex station, minimum 4 ton lots. Prices for this year unchanged.

SODIUM NITRATE.—The Chilian Committee have advised a reduction of 1s. per ton off price ruling up to date. Price for January delivery now £10 7s. per ton, carriage paid buyer's sidings, minimum 6 ton lots. Usual extras for refined qualities.

SODIUM SULPHATE (SALTCAKE).—Prices 50s. per ton, ex works, 52s. 6d. per ton delivered for unground quality. Ground quality 2s. 6d. per ton extra.

SODIUM SULPHIDE.—Prices for home consumption. Solid, 60/62%, £9 per ton. Broken, 60/62%, £10 per ton. Crystals, 30/32%, £7 2s. 6d. per ton, delivered buyer's works on contract, minimum 4 ton lots. Special prices for some consumers. Spot material, 5s. per ton extra. Prices for this year unchanged.

SULPHUR.—Flowers, £12 per ton; roll, £10 15s. per ton; rock, £10 12s. 6d. per ton; ground American, £9 5s. per ton, ex store.

ZINC CHLORIDE, 98%.—British material now quoted, £22 10s. per ton f.o.b. U.K. ports.

ZINC SULPHATE.—Offered from the Continent at about £10 5s. per ton, ex wharf.

NOTE.—The above prices are for bulk business and are not to be taken as applicable to small parcels.

Surface Energy in Chemical Engineering

PROFESSOR W. E. GIBBS will deliver a public address, entitled "The Role of Surface Energy in Chemical Engineering," in the hall of the Royal Society of Arts, John Street, Adelphi, Strand, W.C.2, on Friday, February 8, at 8 p.m., under the auspices of the Chemical Engineering Group of the Society of Chemical Industry. A brief synopsis of the paper is as follows: Surface tension; disintegration of solids and liquids; adsorption phenomena; properties of fine powders; dust explosions; emulsification; flotation phenomena; lubrication; froth formation; catalysis. From this it will be seen that the paper should have interest to all concerned in coal mining, grain milling, oil flotation, edible oil manufacture, oil extraction and solvent distillation, laundry and textile industries, etc. The committee will, consequently, welcome members of these industries or manufactures at the meeting, and, if they desire to take part in the discussion following the paper, confidential advance proofs will be sent to non-members on postal application to the Secretary of the Group, Abbey House, Victoria Street, Westminster, London, S.W.1.

Manchester Chemical Market

(From Our Own Correspondent.)

Manchester, January 24, 1929.

Somewhat patchy conditions have been in evidence on the chemical market here since last report. Deliveries against contracts have, on the whole, been maintained at a fairly satisfactory level, but, so far as the spot market is concerned, although a moderate weight of business has been put through in the aggregate there is marked reluctance on the part of a good many consumers to buy on other than a strictly hand-to-mouth basis, and selling competition is very keen.

Heavy Chemicals

Prussiate of soda is moving off in moderate quantities, and quotations in this section are very firm at from 4½d. to 5¼d. per lb., according to quantity. Phosphate of soda, also, shows no sign of easing off, and current values are well held at £12 5s. to £12 10s. per ton, although the demand is on a comparatively quiet scale. There is a fair weight of business passing in bicarbonate of soda, and values are fully maintained at about £10 10s. per ton. There is some inquiry about for sulphide of sodium at steady prices, the commercial quality selling at round £8 per ton, and the 60–65 per cent. concentrated solid quality at £9 10s. Contract basis prices for caustic soda remain at £12 15s. to £14 per ton, according to quality, and a quietly steady volume of business is being done. Up to £2 15s. per ton is being asked for saltcake, with no special feature to report concerning the demand for this product. Bleaching powder is in moderate request, with offers ranging from about £7 up to £7 10s. per ton. There has been some inquiry about for hyposulphite of soda, quotations for which are steady at £15 5s. to £15 10s. per ton for the photographic quality, and about £9 for the commercial. A quiet trade is passing in the case of chlorate of soda, and prices are pretty steady at 2¾d. per lb. Bichromate of soda meets with a fairly active demand, and on the basis of 3½d. per lb. values are well held. Alkali remains very firm at about £6 per ton, and a quietly steady business in this section of the market is being put through.

There is a moderate inquiry about for caustic potash, offers of which are well maintained at £33 5s. per ton, ex store, for prompt deliveries of one to five-ton lots. Sales of permanganate of potash are not extensive, but quotations in this section are steady at 5⅞d. per lb. for the B.P. grade, and 5½d. per lb. for the commercial kind. Current offers of carbonate of potash are at round £26 5s. per ton, and a moderate demand is being experienced. There is a fairly satisfactory movement of material in the case of yellow prussiate of potash, and prices are firm at from 6¾d. to 7¼d. per lb., according to quantity. Bichromate of potash, also, is selling in fair quantities, and prices are steady on the basis of 4½d. per lb. Chlorate of potash is in quiet request, and at 3d. per lb. quotations show little change.

There has been no further alteration in the price position of arsenic, current offers of this material being in the neighbourhood of £16 5s. per ton, at the mines, for white powdered, Cornish makes; the demand is still comparatively slow. Firmness is a marked feature of the sulphate of copper section, and a moderately steady business is reported at up to £27 15s. per ton, f.o.b. Offers of the acetates of lime are still not excessive, and the price position is strong in consequence, the grey product being quoted at about £17 15s. per ton, and the brown at £9. There is a quiet call for the acetates of lead at unchanged prices, white selling at about £40 per ton, and brown at £39 10s. Nitrate of lead continues rather slow, but values are held at from £34 10s. to £35 per ton.

Acids and Tar Products

Transactions in citric acid are not extensive individually, and at round 2s. 2½d. per lb. the price position is somewhat uncertain. Tartaric acid is steady and in moderate request at 1s. 4½d. per lb. In the case of oxalic acid the demand this week has been on the quiet side, but values show little change at about £1 12s. per cwt. There is a steady call for acetic acid at £36 per ton for the 80 per cent. commercial grade, and £66 for the glacial.

Pitch prices seem to be held for the time being round £1 15s. per ton, f.o.b., but business in this section is relatively slow. Creosote oil is easy at 4⅜d. per gallon, naked, and demand for home and export is inactive. Crystal carbolic acid is steady and in fair request at 6¼d. per lb., f.o.b., and crude about unchanged at 1s. 10d. per gallon. A quiet business is being done in solvent naphtha at about 1s. 2d. per gallon.

The Nickel Merger

Agreement Ratified

We are informed by Lord Melchett, the Hon. Henry Mond and Mr. D. O. Evans that holders of over 90 per cent. of the preference shares and of over 87 per cent. of the ordinary shares of the Mond Nickel Co., Ltd., have already deposited their shares to be exchanged for stock in the International Nickel Co. of Canada, Ltd. The total of such deposited shares carries 88 per cent. of the total voting power of the shares of the Mond Nickel Co., Ltd. The number of shares required under the terms of the provisional agreement with the International Nickel Co. of Canada to make the scheme effective has, therefore, been greatly exceeded. The parties named in the provisional agreement have, however, agreed to extend the time for acceptance of deposited shares in the Mond Nickel Co. to February 1 next, in order to give an opportunity to those shareholders who have been unavoidably prevented from, or have delayed in, depositing their shares, a final opportunity of doing so. Such shareholders are therefore reminded that they should take immediate action so as not to be prejudiced as to the marketability of their shares or lose the undoubted advantages which will accrue to them from the merger of interests of the two companies.

International Company's Statement

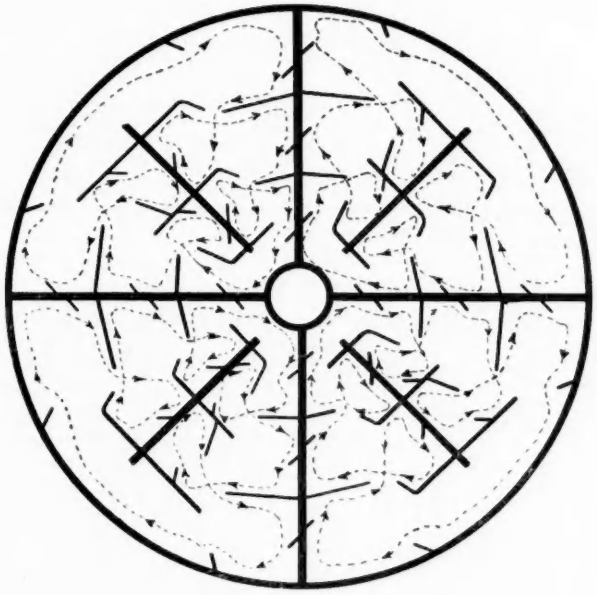
The following statement, which has been issued by Mr. R. C. Stanley, president of the International Nickel Co., of Canada, Ltd., is published for the information of British shareholders in the Mond Nickel Co., Ltd., and the International Nickel Co., of Canada, Ltd.

"In my last annual report, it was stated that we expected our cross-cuts to reach high-grade ore in the lower levels of the Frood Mine early in 1929. It is gratifying to state that we have, as predicted, now reached our footwall ore-body at the 1,200 foot, 1,600-foot, 2,400-foot, and 2,800-foot levels. Results thus far obtained fully meet expectations, in that the ore is exceptionally high grade. Samples taken in crosscuts show in the work accomplished to date, 100 feet, averaging approximately 5 per cent. copper nickel at the 1,200-foot level, 45 feet averaging approximately 6 per cent. copper nickel at the 1,600-foot level, 72 feet averaging approximately 8 per cent. copper nickel at the 2,500-foot level, and 62 feet averaging approximately 22.5 per cent. copper nickel at the 2,800-foot level. Our work has not progressed sufficiently to report exact tonnages or accurate averate metal contents, particularly precious metals. From the exploration work thus far accomplished, we have proven a tonnage of high-grade ore sufficient to meet requirements for many years.

"It is interesting to note that the prediction made by Lord Melchett, chairman of the Mond Nickel Co., Ltd., to Press representatives, a summary of which was published in the Press on December 22, 1928, has already been borne out by the development results reported above, and, further, that the high copper values have been intersected in the International Nickel Co.'s ground on the 2,800-foot level—that is, 300 feet higher than was the case in the Mond area. Considerable work will be essential in both properties before an estimate of the ore reserve can be made, but it is clear already that the tonnage and grade, particularly of copper, will be even higher than was forecast by the borehole results."

Bradford Dyers' Association Sued in Patent Action

Mr. Justice Clauson, in the Chancery Division, on Monday, continued the hearing of the action by Samuel Heap and Sons, Ltd., of Caldershaw Mills, Rochdale, against the Bradford Dyers' Association, Ltd., for an injunction restraining alleged infringement of their patented process for mercerising cotton in a mixed fabric. Defendants denied infringement and alleged that the process was not novel. Dr. John Goldsmith, consulting chemist, continued his evidence for plaintiffs. On Wednesday, the case for the defence was opened.



HOW FRASERS' "RADIAL PATH" DRIERS BRING NEW ECONOMY

THIS IS a drier designed expressly to reduce the present cost, per pound or ton, of processing your material.

THE DIAGRAM shows a section of the drum, with its patented internal cell construction which ensures great evenness of heating. With the Fraser 'Radial Path' drier, localised overheating is prevented. It is thus that this drier is applied successfully to materials impossible to treat in an ordinary drum drier.

THE WIDER range of the 'Radial Path' drier is coupled with great operating economy. Details of construction throughout conserve heat and power, reducing your costs to a minimum. At the same time actual effective heat transference is facilitated, powdering is minimised, and yield thus improved.

CATALOGUE 8A, Section 2, describes the new 'Radial Path' drier, and shows its many industrial applications. Needless to say the plant is built at our Dagenham works. May we send you the Catalogue?

"RADIAL PATH" DRIERS

By FRASERS of DAGENHAM

W. J. FRASER & CO., LTD., DAGENHAM, ESSEX, ENGLAND

Established for nearly 100 years

TAS. Fz. 52

Company News

SQUIRE AND CO. (BIRMINGHAM).—An interim dividend at the rate of 5 per cent. per annum is announced.

SOUTH METROPOLITAN GAS CO.—Subject to audit, the directors recommend a final dividend for the past year on the ordinary stock at the rate of 6¼ per cent. per annum, less the interim dividend of 2½ per cent. paid in September last. This total rate of dividend is the same as for 1927, and goes against the 6 per cent. for 1926.

CHEMICAL NATIONAL BANK OF NEW YORK.—The balance-sheet as at December 31, 1928, shows loans and discounts at $163,953,249, U.S. bonds and certificates and other investments $22,057,826, acceptances $19,854,368, and cash, etc., $81,881,833. On assets side appears: Acceptances $20,815,683; acceptances of other banks sold with the Chemical National Bank's endorsement, $15,152,550; bills payable, $14,700,000; deposits, $208,896,936. Capital, surplus and undivided profits stand at $26,294,212.

The Analysis of Dyestuffs

BEFORE a meeting of the West Riding Section of the Society of Dyers and Colourists in Bradford, last week, Professor H. E. Fierz-David, of Zurich, delivered a lecture on "The Analysis of Dyestuffs, Yesterday and To-day." He pointed out that in the past users of dyestuffs were, as a rule, not very much interested in the exact constitution of any product which they were going to use. They were satisfied if the dyestuff was fast to light, chlorine, washing, stoving, etc., and the only points which interested them very much were the mode of application and the price. During the past two decades however, things had changed, and the younger generation wanted to know something about the dyestuffs they used. Those most interested in the question, though, were the colour manufacturers, because competition was very keen, and the problem only too often arose as to what was the composition of a dyestuff offered by a competitor, how it was manufactured, and what was the exact constitution.

Professor Fierz-David said there still remained a lot of work to be done. The terms "reddish," "blueish," "more blueish," etc., must give way in every case to strict scientific designations. Not only must azo dyes be investigated, but all the other groups as well. The constant growth of dyestuffs forbade a continuance of old and antiquated analytical methods, and only absolutely scientific methods would solve the difficulties. The work which had been so conspicuously started by Arthur Green and his collaborators must be pursued vigorously.

British Industries Fair

THE Prince of Wales is to be present at the Government banquet to be held at the Mansion House, by permission of the Lord Mayor, on February 18, the opening day of the British Industries Fair in London and Birmingham. This will be the first public dinner which the Prince has attended since the King's illness. The Prime Minister, Mr. Baldwin, has also notified his intention of being present, and the chair will be taken by the President of the Board of Trade, Sir Philip Cunliffe-Lister, M.P. Up to Monday, the amount of space allotted in the London section to chemicals was 13,602 square feet, as compared with 12,770 square feet in 1927.

Memorial Service for Sir John Brunner

A MEMORIAL service for the late Sir John Brunner was held at Essex Church, Notting-hill-gate, London, on Friday, January 18. The principal mourners included Mrs. Wilfred Brunner, Miss Beatrice Brunner, Major G. H. Brunner, Mrs. A. B. Brunner, Mr. Felix Brunner, Mr. Patrick Brunner, and Master H. Brunner. The congregation, which was very large, included Mrs. H. B. Irving, Mr. Emile Mond, Mr. Henry Mond (representing Lord Melchett), and Mr. Dickens.

Revised German Atomic Weights

THE German Atomic Weight Commission, consisting of Professors O. Hönigschmidt, M. Bodenstein, O. Hahn and R. J. Meyer, states in its report for the year 1928 that they have adopted the following changes in atomic weight: barium 137.36 (hitherto 137.37); cerium, 140.13 (hitherto, 140.2); erbium, 167.64 (hitherto 167.7); Neon, 20.18 (hitherto 20.2); and uranium, 238.14 (hitherto 238.18).

New Chemical Trade Marks

Applications for Registration

This list has been specially compiled for us from official sources by Gee and Co., Patent and Trade Mark Agents, Staple House, 51 and 52, Chancery Lane, London, W.C.2, from whom further information may be obtained, and to whom we have arranged to refer any inquiries relating to Patents, Trade Marks, and Designs.

Opposition to the Registration of the following Trade Marks can be lodged up to February 16, 1929.

EUFLOTOL.

497,093. Class 1. Chemical substances used in manufactures, photography or philosophical research, and anti-corrosives. I.G. Farbenindustrie Aktiengesellschaft (a corporation organised under the laws of Germany), 28, Mainzer Landstrasse, Frankfurt-on-the-Main, Germany; manufacturers. November 15, 1928. (To be Associated. Sec. 24.)

BLYOLINE.

497,914. Class 1. Paints, varnishes, enamels, colours, distempers, japans, lacquers, driers, wood preservatives, wood stains, anti-corrosive and anti-fouling compositions, and anti-corrosive oils. The International Paint and Compositions Co., Ltd., 31 and 32, Grosvenor Place, London, S.W.1; manufacturers and general merchants. December 8, 1928.

ADURA.

497,251. Class 4. Glycerine for use in manufactures. Georg Shicht Aktien-Gesellschaft (a joint stock company organised under the laws of Czechoslovakia), Dresdnerstrasse 34, Aussig, Czechoslovakia; manufacturers. November 20, 1928. (To be Associated. Sect. 24.)

Progress of Artificial Silk

IN opening on Monday at the New Hall, Olympia, the fourth exhibition of artificial silk goods, Sir Robert Horne, referring to the rapid growth of the industry, said that within the last few years it had provided work for 30,000 at least of their people, and for that the whole country must be grateful. They were only at the beginning of what this industry could do. In 1900 the whole production in the world was 1,000 metric tons; in 1910 that figure had risen to 8,000 metric tons; in 1920 it was 25,000; and to-day it was 154,000 metric tons. This was one of the things in which the enterprise of the British people had distinguished itself most creditably. Ten years ago Great Britain was only fourth in the list of countries producing artificial silk; to-day it was second only to the United States of America, an enormously bigger country with three times the population. In 1925 this country was producing only 24,000,000 lb. weight of artificial silk. In 1928 it produced 52,000,000 lb. weight. As an old President of the Board of Trade, he looked on the strides which this industry had made as a matter of the greatest possible congratulation to all who were interested in the industries of this country. To-day they were not merely supplying the great bulk of their own needs, but were selling enough of their artificial silk products abroad to produce to them on balance an extra revenue of over seven million pounds sterling in a year. That was a great record. The union of artificial silk with cotton and with wool had helped those industries, and would do so more and more.

The Liquid Oxygen Explosives Order, 1928

AN Order in Council issued under date December 21, 1928, allows materials other than carbonaceous materials to be authorised for use with liquid oxygen explosives. The Order is as follows: The manufacture of an explosive consisting of an absorbent carbonaceous material impregnated with liquid air or oxygen with or without the addition of other subtances shall be exempt from such of the provisions of the Explosives Act, 1875, as relate to the manufacture of an explosive subject to the conditions that no person shall manufacture the explosive unless he has obtained a licence from the Secretary of State authorising him to do so and complies with any conditions which may be attached to the licence, and that no material, other than a carbonaceous material, is used unless it has been duly authorised in the said licence. The Order in Council of July 14, 1921, is hereby repealed.

Former Director's Unsuccessful Action

In the King's Bench Division on Thursday and Friday, January 17 and 18, the Lord Chief Justice heard an action by Mr. Arthur Edmond Hawker, of Chigwell, Essex, claiming from the British Feeding-Meals Manufacturing Co., Ltd., of Adelaide House, London Bridge, damages for alleged wrongful dismissal from his position as joint managing director of the company. Mr. Rayner Goddard said Mr. Hawker was appointed joint managing director of the company for five years at £2,000 a year, but differences soon arose between Mr. Noel Clarke, the other managing director, and him. The board of directors passed a resolution which made Mr. Hawker subordinate to Mr. Clarke, a position which he accepted. In July the board, at the instigation, it was alleged, of Mr. Clarke, adopted a report involving reorganisation and rearrangement of business matters which would have resulted in Mr. Hawker being banished to the company's Poplar sorting depot. Mr. Hawker declined to go to Poplar, and was dismissed from his position. Mr. Hawker, giving evidence, said if he had gone to Poplar he could not have stood the atmosphere there. Cross-examined by Sir Patrick Hastings, he agreed that Mr. Clarke used his endeavours to get him appointed managing director on the terms he wanted.

At the conclusion of Mr. Hawker's case Sir Patrick Hastings, K.C., for the defendants, argued that they had no case to answer because it could not be said that they repudiated their contract with Mr. Hawker, and so forced him to resign his position, when they merely ordered him to do the work which he alleged was outside his duties as managing director.

Lord Hewart held that there was no evidence that the British Feeding-Meals Manufacturing Co. had repudiated their contract with Mr. Hawker. The case was accordingly withdrawn from the jury, and judgment was entered for the company with costs.

Atlas Artificial Silk Processes

The rights in the Brandwood processes and patents for the British Empire, except Canada, together with a 50 per cent. interest for other countries, are being acquired by the Atlas Artificial Silk Processes, Ltd., and the latter invited applications on Monday for an issue at par of 2,650,000 shares of 5s. each. For the processes it is claimed that the existing methods of production of artificial silk should be entirely revolutionised, their adoption not only enabling artificial silk to be produced in the finer deniers at approximately half the present labour costs, but by substantially eliminating the extensive handling by operatives in the various stages, production should be ensured from the outset of almost entirely "Grade A" quality. Certain rights, apart from manufacturing, are reserved to the Elton Cop Dyeing Co. Producers of artificial silk, it is pointed out, usually supply in hanks only, but neither knitters nor weavers can use it in that form, whereas this company will be able to deliver the silk as required by the user. Works at Littleborough are to be purchased, and, as part of the p lant required is now ready for delivery and installation, production is expected to commence within three months. The technical consultants to the company are Mr. William Bacon, Mr. A. J. Hall, Mr. Fred Ferrand, and Mr. John Brandwood (the latter being director of the Elton Cop Dyeing Co., Ltd.).

I.C.I. Developments

The directors of Murex, Ltd., ironmasters and manufacturers of tungsten powder and alloys, state that the negotiations referred to at the last general meeting for the acquisition of another business have been completed. The goodwill, patents, and trade marks of Thermit, Ltd., the entire issued share capital of which is owned by Imperial Chemical Industries, Ltd., together with certain plant and stocks, have been acquired, the payment for which will be satisfied by an issue of fully paid shares of Murex, Ltd. The number of shares to be issued has been agreed by reference to the estimated value of the assets, including goodwill, of Thermit, Ltd., and the probable future earning capacity of Murex, Ltd. Manufacture will be concentrated at the Rainham Works, and the stocks, stores and plant referred to are now being transferred there. It is proposed that Imperial Chemical Industries, Ltd., shall nominate a director to the board of Murex, Ltd., as soon as the necessary agreements are completed.

The Malagash Salt Co. of New Glasgow, Nova Scotia, is being acquired by Imperial Chemical Industries, Ltd.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

Mortgages and Charges

[*NOTE.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case, the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.*]

CROCKATT (JOHN) LTD., Leeds, dyers and cleaners. (M., 26/1/29.) Reg. January 4, £1,700 mortgage, to Leeds Permanent Building Society; charged on 17, Regent Road, Morecambe and Heysham. *£12,896. February 14, 1928.

RAINFORD TAR PRODUCTS, LTD., London, W.C. (M., 26/1/29.) Reg. January 3, series of £30,000 debentures, present issue of £29,400; general charge.

Satisfactions

ELLIMAN SONS AND CO., LTD., Slough, embrocation manufacturers. (M. S., 26/1/29.) Satisfaction registered January 9, £7,500, balance of amount registered December 15, 1925.

LILY HILL DYEING CO., LTD., Manchester. (M.S., 26/1/29.) Satisfaction registered January 9, £2,000 registered February 26, 1927.

PLYMOUTH OXYGEN CO., LTD. (M.S., 26/1/29.) Satisfaction registered January 7, £1,000 (not ex.), registered March 29, 1927.

London Gazette, &c.

Companies Winding Up Voluntarily

TIMOTHY WHITE CO., LTD. (C.W.U.V., 26/1/29.) By Special Resolution, December 31, confirmed January 17. D. White and E. P. Forse, appointed as liquidators. Meeting of Creditors at 30, Chandos Street, Portsmouth, on Wednesday, February 6, at 12 noon. All creditors have been, or will be, paid in full.

SAVORY AND MOORE, LTD. (C.W.U.V., 26/1/29.) By Special Resolutions, December 27, confirmed January 11. E. J. C. Savory, 61, Carey Street, Lincoln's Inn, appointed as liquidator for the purpose of reconstruction.

Receivership

DUROGLOSS POLISHES, LTD. (R., 26/1/29.) S. Cole, of Sardinia House, Kingsway, W.C., was appointed Receiver on January 11, 1929, under powers contained in debenture dated March 29, 1928.

New Companies Registered

FELTON AND CREPIN, LTD., 15, Coopers Row, London, E.C.3.—Registered January 19. Nom. capital, £10,000 in £1 shares. Import and export produce, colour and chemical merchants, etc. Directors:—F. W. L. Crepin and F. R. Crepin.

NORTH BRITISH CHEMICAL CO. (1929), LTD.—Registered January 21. Nom. capital, £10,000 in £1 shares. To acquire the business of the North British Chemical Co. (England), Ltd., to adopt an agreement with said old company and its liquidator, and to carry on the business of manufacturers of dyestuffs, for the textile, leather and paper trades, foodstuff colours, lakes, pigments, paints, stains, varnishes, lacquers and enamels, etc. Director:—L. Blundell, Hillside, Prestwich Park, Manchester.

WESTMINSTER OXIDE CO., LTD.—Registered January 17. Nom. capital, £1,000 in 2s. shares. To acquire from J. P. Fraser the benefit of certain existing inventions relating to zinc oxide, and to carry on the business of manufacturers of and dealers in zinc, zinc oxide, lead, spelter or any other metal or alloy, etc. A subscriber:—F. W. Martin, 21, Estelle Road, Hampstead, London, N.W.3.